Nokia Customer Care

Service Manual

RM-146; RM-147; RM-174; RM-181 (Nokia 5200; Nokia 5300)

Mobile Terminal

Part No: 9254056 (Issue 1)

COMPANY CONFIDENTIAL

NOKIA

Amendment Record Sheet

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IMPORTANT

This document is intended for use by qualified service personnel only.

Warnings and cautions

Warnings

- IF THE DEVICE CAN BE INSTALLED IN A VEHICLE, CARE MUST BE TAKEN ON INSTALLATION IN VEHICLES FITTED WITH ELECTRONIC ENGINE MANAGEMENT SYSTEMS AND ANTI-SKID BRAKING SYSTEMS. UNDER CERTAIN FAULT CONDITIONS, EMITTED RF ENERGY CAN AFFECT THEIR OPERATION. IF NECESSARY, CONSULT THE VEHICLE DEALER/MANUFACTURER TO DETERMINE THE IMMUNITY OF VEHICLE ELECTRONIC SYSTEMS TO RF ENERGY.
- THE PRODUCT MUST NOT BE OPERATED IN AREAS LIKELY TO CONTAIN POTENTIALLY EXPLOSIVE ATMOSPHERES, FOR EXAMPLE, PETROL STATIONS (SERVICE STATIONS), BLASTING AREAS ETC.
- OPERATION OF ANY RADIO TRANSMITTING EQUIPMENT, INCLUDING CELLULAR TELEPHONES, MAY INTERFERE WITH THE FUNCTIONALITY OF INADEQUATELY PROTECTED MEDICAL DEVICES. CONSULT A PHYSICIAN OR THE MANUFACTURER OF THE MEDICAL DEVICE IF YOU HAVE ANY QUESTIONS. OTHER ELECTRONIC EQUIPMENT MAY ALSO BE SUBJECT TO INTERFERENCE.
- BEFORE MAKING ANY TEST CONNECTIONS, MAKE SURE YOU HAVE SWITCHED OFF ALL EQUIPMENT.

Cautions

- Servicing and alignment must be undertaken by qualified personnel only.
- Ensure all work is carried out at an anti-static workstation and that an anti-static wrist strap is worn.
- Ensure solder, wire, or foreign matter does not enter the telephone as damage may result.
- Use only approved components as specified in the parts list.
- Ensure all components, modules, screws and insulators are correctly re-fitted after servicing and alignment.
- Ensure all cables and wires are repositioned correctly.
- Never test a mobile phone WCDMA transmitter with full Tx power, if there is no possibility to perform the measurements in a good performance RF-shielded room. Even low power WCDMA transmitters may disturb nearby WCDMA networks and cause problems to 3G cellular phone communication in a wide area.
- During testing never activate the GSM or WCDMA transmitter without a proper antenna load, otherwise GSM or WCDMA PA may be damaged.

For your safety

QUALIFIED SERVICE

Only qualified personnel may install or repair phone equipment.

ACCESSORIES AND BATTERIES

Use only approved accessories and batteries. Do not connect incompatible products.

CONNECTING TO OTHER DEVICES

When connecting to any other device, read its user’s guide for detailed safety instructions. Do not connect incompatible products.

Care and maintenance

This product is of superior design and craftsmanship and should be treated with care. The suggestions below will help you to fulfil any warranty obligations and to enjoy this product for many years.

- Keep the phone and all its parts and accessories out of the reach of small children.
- Keep the phone dry. Precipitation, humidity and all types of liquids or moisture can contain minerals that will corrode electronic circuits.
- Do not use or store the phone in dusty, dirty areas. Its moving parts can be damaged.
- Do not store the phone in hot areas. High temperatures can shorten the life of electronic devices, damage batteries, and warp or melt certain plastics.
- Do not store the phone in cold areas. When it warms up (to its normal temperature), moisture can form inside, which may damage electronic circuit boards.
- Do not drop, knock or shake the phone. Rough handling can break internal circuit boards.
- Do not use harsh chemicals, cleaning solvents, or strong detergents to clean the phone.
- Do not paint the phone. Paint can clog the moving parts and prevent proper operation.
- Use only the supplied or an approved replacement antenna. Unauthorised antennas, modifications or attachments could damage the phone and may violate regulations governing radio devices.

All of the above suggestions apply equally to the product, battery, charger or any accessory.

ESD protection

Nokia requires that service points have sufficient ESD protection (against static electricity) when servicing the phone.

Any product of which the covers are removed must be handled with ESD protection. The SIM card can be replaced without ESD protection if the product is otherwise ready for use.

To replace the covers ESD protection must be applied.

All electronic parts of the product are susceptible to ESD. Resistors, too, can be damaged by static electricity discharge.

All ESD sensitive parts must be packed in metallized protective bags during shipping and handling outside any ESD Protected Area (EPA).

Every repair action involving opening the product or handling the product components must be done under ESD protection.

ESD protected spare part packages MUST NOT be opened/closed out of an ESD Protected Area.

For more information and local requirements about ESD protection and ESD Protected Area, contact your local Nokia After Market Services representative.

Battery information

Note: A new battery's full performance is achieved only after two or three complete charge and discharge cycles!

The battery can be charged and discharged hundreds of times but it will eventually wear out. When the operating time (talk-time and standby time) is noticeably shorter than normal, it is time to buy a new battery.

Use only batteries approved by the phone manufacturer and recharge the battery only with the chargers approved by the manufacturer. Unplug the charger when not in use. Do not leave the battery connected to a charger for longer than a week, since overcharging may shorten its lifetime. If left unused a fully charged battery will discharge itself over time.

Temperature extremes can affect the ability of your battery to charge.

For good operation times with Ni-Cd/NiMh batteries, discharge the battery from time to time by leaving the product switched on until it turns itself off (or by using the battery discharge facility of any approved accessory available for the product). Do not attempt to discharge the battery by any other means.

Use the battery only for its intended purpose.

Never use any charger or battery which is damaged.

Do not short-circuit the battery. Accidental short-circuiting can occur when a metallic object (coin, clip or pen) causes direct connection of the + and - terminals of the battery (metal strips on the battery) for example when you carry a spare battery in your pocket or purse. Short-circuiting the terminals may damage the battery or the connecting object.

Leaving the battery in hot or cold places, such as in a closed car in summer or winter conditions, will reduce the capacity and lifetime of the battery. Always try to keep the battery between 15°C and 25°C (59°F and 77° F). A phone with a hot or cold battery may temporarily not work, even when the battery is fully charged. Batteries' performance is particularly limited in temperatures well below freezing.

Do not dispose of batteries in a fire!

Dispose of batteries according to local regulations (e.g. recycling). Do not dispose as household waste.

Company Policy

Our policy is of continuous development; details of all technical modifications will be included with service bulletins.

While every endeavour has been made to ensure the accuracy of this document, some errors may exist. If any errors are found by the reader, NOKIA MOBILE PHONES Business Group should be notified in writing/e-mail.

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Nokia 5200; Nokia 5300 Service Manual Structure

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4 Service Tools and Service Concepts
5 Disassembly and reassembly instructions
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1 — General information

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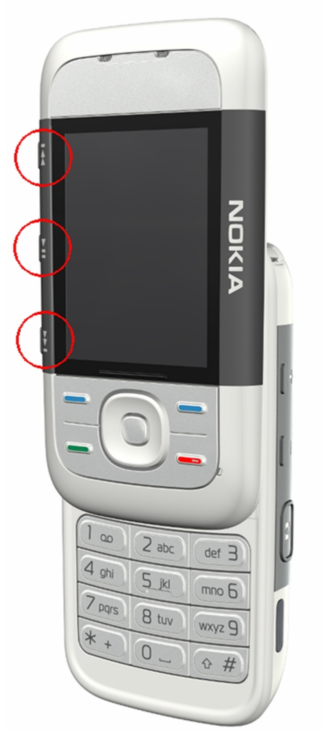
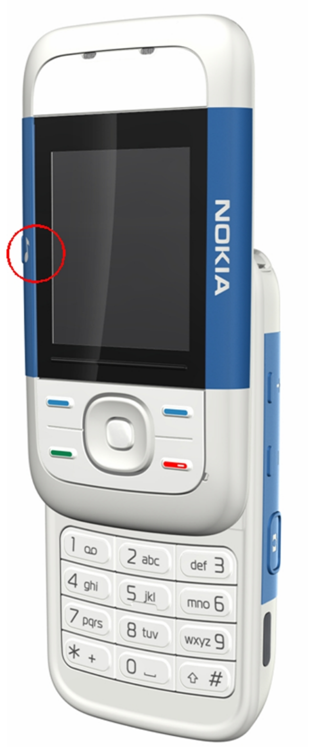
Product selection

Please refer to the table below for an overview of the variants.

Design				
Model	Nokia 5300	Nokia 5300	Nokia 5200	Nokia 5200
Type	RM-146	RM-147	RM-174	RM-181
Network	GSM900/1800/1900	GSM850/1800/1900	GSM900/1800/1900	GSM850/1800/1900
Display	QVGA 2"	QVGA 2"	CSTN 1.8"	CSTN 1.8"
Camera	1.3 Mpix	1.3 Mpix	VGA	VGA
Media keys	3	3	1	1
HWA	X	X		

Features

Phone features

General features

- Demo mode (phone demo without SIM card)

Display and keypad features

- Display: please refer to Product selection (page 1–5).
- Dedicated camera capture key
- Power switch
- Volume up and down keys

- RM-146/147: 3 media keys

Hardware features

- Slide phone
- Camera: please refer to Product selection (page 1–5).
- Bluetooth
- IrDA
- USB through mini USB connector
- AV connector for eg. headset
- 2 mm charger plug interface
- Internal vibrator
- Plug-in SIM (1.8 V and 3.0 V)
- Real time clock
- µSD card
- USB
- FM radio

RF features

- Networks: please refer to Product selection (page 1–5).
- Automatic switching between bands
- EDGE (EGPRS): Class 10, download up to 236.8 kbps
- GPRS: (General Packet Radio Service): Class 10, download up to 85.6 kbps

Software and User interface features

Software features

- ISA OS 8.0s Platform
- Nokia Series 40 User interface (UI): Java MIDP 2.0

UI features

Note: These features may vary between the variants.

Imaging	• RM-146/147: 1.3-megapixel camera with 8x digital zoom (1280 x 1024 pixel resolution) RM-174/181: VGA camera with 4x digital zoom (640 x 480 pixel resolution) • Full-screen viewfinder • Camera key for taking pictures • PictBridge printing via USB cable

Multimedia	• MP3 player supporting formats including MP3, MP4, AAC, AAC+, eAAC+, WMA, H.263, H.264 (eAAC+ only playback no streaming) • FM stereo radio with Visual Radio • Video streaming (3GPP) • Video ringing tones • MIDI ringing tones up to 64 polyphonies
Memory functions	• Combo memory with 32 MB flash and 16 MB RAM - about 10 MB user data (10 MB user memory: 9 MB for gallery and applications, 1 MB for contacts, notes, calendar entries) • Hotswap microSD memory card slot supporting up to 2GB microSD memory cards (available as enhancements)
Messaging	• Simplified messaging with recently used contacts log and groups • Email: Access your work and private email accounts; supports SMTP, POP3, and IMAP4 protocols. Support for attachments (Java version) • Xpress audio messaging: Record your own voice message and send to compatible devices • MMS OMA 1.2: Combine image, video, text, and voice clips and send as an MMS to a compatible phone or PC; use MMS to tell your story with a multi-slide presentation. The MMS OMA 1.2 specification allows you to send/receive messages up to 300 kB in size. • Text messaging: Supports concatenated SMS, picture messaging, SMS distribution list • Predictive text input: Support for all major languages in Europe and Asia-Pacific • Instant Messaging
Applications	• Java™ MIDP 2.0 with over-the-air download • Java-based applications and games • Wireless presenter (PC application on webpage) • Nokia Sensor application for improved networking • Games: 3D Soccer and Snake
Connectivity	• Nokia PC Suite with USB, Bluetooth and IrDa connectivity • Bluetooth wireless connectivity (SIM access, headset, and handsfree profiles) incl. stereo support for headsets • Interface with mini USB • FOTA (Flashing over the air) - dependent on variant • Local/remote SyncML data synchronization
Browsing	• Integrated XHTML browser • Smart content download - OMA Digital rights management 1.0
Data transfer	• EDGE (EGPRS): Class 10, download up to 236.8 kbps • GPRS: (General Packet Radio Service): Class 10, download up to 85.6 kbps **Note:** Actual achieved speeds may vary depending on network support

Voice features	• Push to talk: Select the person or group you want to talk to and press the Push to talk key (long press of volume up key) to communicate • Enhanced voice dialing with SIND: Speaker-independent name dialing on long press volume down key • Integrated handsfree speaker with new high quality speaker for better audio experience (mono) • Voice commands • Voice recorder
Digital services	• User Interface (UI) themes including e.g. animated wallpapers and screensavers, ringing tones • Ringing tones: Video, MP3 ringing tones, True Tones and MIDI ringing, alert, and gaming tones with support of 64 polyphony • OTA download possibility for: Themes, True Tones, MP3 ringing tones, MIDI ringing tones, screensavers, wallpapers, 3GPP streaming, images and videos, Series 40 Java games and applications
Personal information management (PIM)	• Manage your time and information with the enhanced calendar, and view your notes on the new active standby mode • Organizer with calendar, to-do list, notes and calculator/li> • Alarm clock, Countdown timer (normal and interval timer)
Call management	• Speed dialing • Logs: Keeps lists of your dialed, received, and missed calls • Automatic answer (works with headset or car kit only) • Call waiting, call hold, call divert, call timer

Accessories

Table 1 Batteries and chargers

Type	Name
Note: This phone is charged through the smaller Nokia standard interface (2.0 mm plug). The 3.5 mm standard charger can be used together with the CA-44 charger adapter.	
AC-1	Compact charger
AC-3	Compact charger
AC-4	Travel performance charger
AC-5	Travel performance charger
ACP-7	Standard charger
ACP-8	Travel charger
ACP-9	Standard charger
ACP-12	Travel charger
BL-5B	RM-146/147: Battery 860 mAh Li-Ion RM-174/181: Battery 820 mAh Li-Ion
CA-44	Charger adapter (from 3.5 mm -> 2 mm)

Type	Name
DC-4	Mobile charger
DT-14	Spare battery charger
LCH-8	Mobile charger
LCH-9	Mobile charger
LCH-12	Mobile charger

Table 2 Car accessories

Type	Name
CK-1W	Wireless car kit
CK-7W	Advanced car kit
CR-39	Universal car holder
HF-6W	Wireless plug-in handsfree
HSU-4	Privacy handset
N610	Car kit phone
N616	Car kit
N810	Car phone

Table 3 Audio

Type	Name
AD-42W	Wireless audio gateway
AD-50	Universal headphone adapter
HDA-11	TTY adapter
HDW-3	Bluetooth headset
HS-4W	Wireless boom headset
HS-11W	Wireless headset
HS-12W	Wireless stereo headet
HS-13W	Wireless Image headet
HS-21W	Wireless clip-on headet
HS-24W	Bluetooth headset (= BH-200)
HS-25W	Bluetooth headset (= BH-900)
HS-26W	Wireless headset
HS-34W	Wireless stereo music headset
HS-36W	Wireless headset
HS-37W	Wireless headset

Type	Name
HS-40	Mono headset
HS-47	Stereo headset
HS-50W	Wireless headset
HS-58W	Wireless headset
HS-62	Stereo headset

Table 4 Data

Type	Name
DKE-2	USB cable
MU-22	1 GB µSD card
MU-25	64 MB µSD card
MU-26	128 MB µSD card
MU-27	256 MB µSD card
MU-28	512 MB µSD card
MU-37	2 GB µSD card

Table 5 Imaging

Type	Name
PD-1	Image album
PT-6	Remote camera

2 — Parts and layouts

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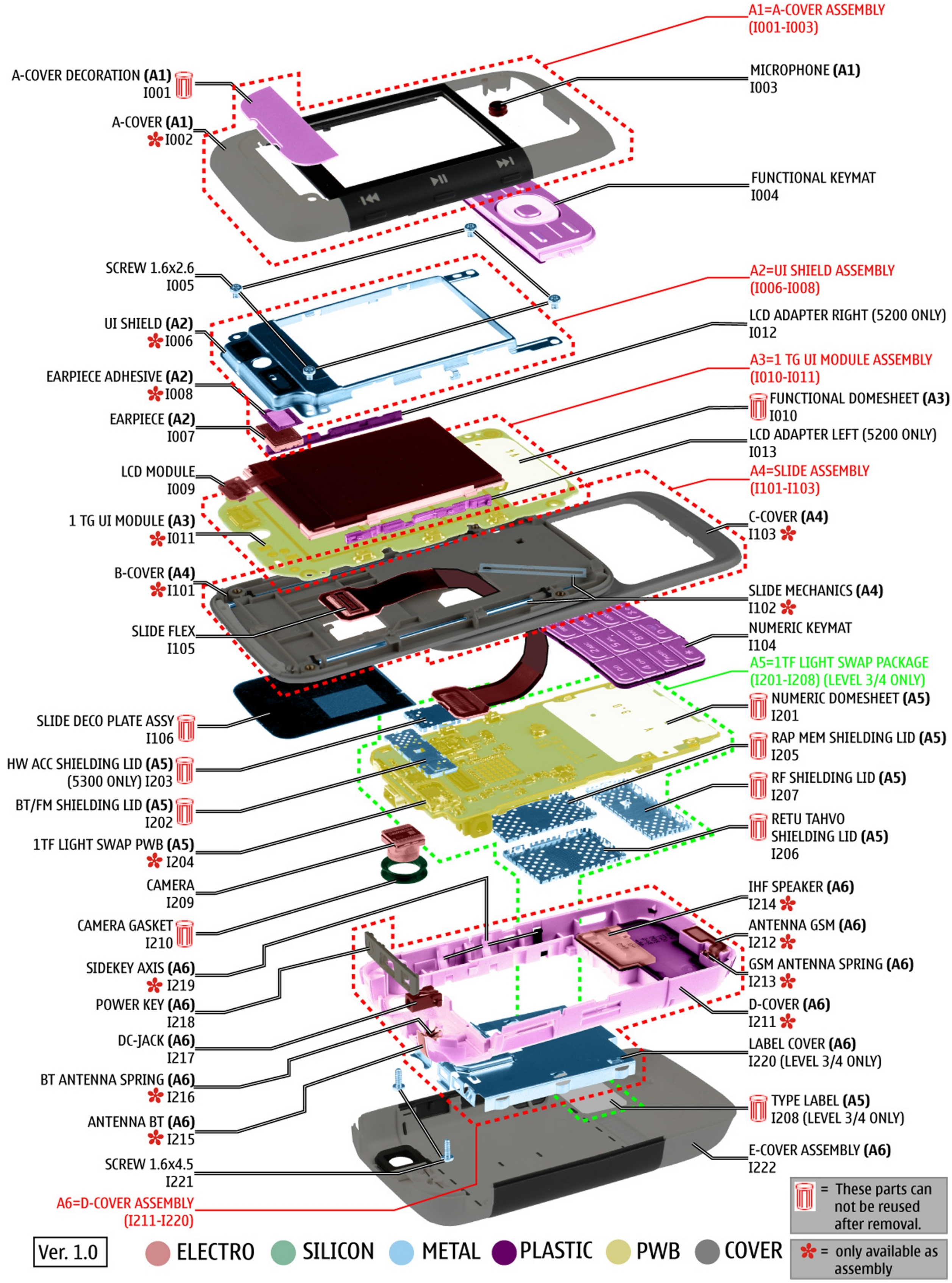
Exploded view


A1=A-COVER ASSEMBLY
(I001-I003)
A-COVER DECORATION **(A1)** 🗑 I001
A-COVER **(A1)** ✱ I002
MICROPHONE **(A1)** I003
FUNCTIONAL KEYMAT I004
SCREW 1.6x2.6 I005
A2=UI SHIELD ASSEMBLY
(I006-I008)
UI SHIELD **(A2)** ✱ I006
LCD ADAPTER RIGHT (5200 ONLY) I012
A3=1 TG UI MODULE ASSEMBLY
(I010-I011)
EARPIECE ADHESIVE **(A2)** ✱ I008
🗑 FUNCTIONAL DOMESHEET **(A3)** I010
EARPIECE **(A2)** I007
LCD ADAPTER LEFT (5200 ONLY) I013
LCD MODULE I009
A4=SLIDE ASSEMBLY
(I101-I103)
1 TG UI MODULE **(A3)** ✱ I011
C-COVER **(A4)** I103 ✱
B-COVER **(A4)** ✱ I101
SLIDE MECHANICS **(A4)** I102 ✱
SLIDE FLEX I105
NUMERIC KEYMAT I104
A5=1TF LIGHT SWAP PACKAGE
(I201-I208) (LEVEL 3/4 ONLY)
SLIDE DECO PLATE ASSY 🗑 I106
🗑 NUMERIC DOMESHEET **(A5)** I201
HW ACC SHIELDING LID **(A5)** 🗑 (5300 ONLY) I203
🗑 RAP MEM SHIELDING LID **(A5)** I205
BT/FM SHIELDING LID **(A5)** 🗑 I202
🗑 RF SHIELDING LID **(A5)** I207
1TF LIGHT SWAP PWB **(A5)** ✱ I204
🗑 RETU TAHVO SHIELDING LID **(A5)** I206
CAMERA I209
IHF SPEAKER **(A6)** I214 ✱
CAMERA GASKET 🗑 I210
ANTENNA GSM **(A6)** I212 ✱
SIDEKEY AXIS **(A6)** ✱ I219
GSM ANTENNA SPRING **(A6)** I213 ✱
POWER KEY **(A6)** I218
D-COVER **(A6)** I211 ✱
DC-JACK **(A6)** I217
LABEL COVER **(A6)** I220 (LEVEL 3/4 ONLY)
BT ANTENNA SPRING **(A6)** ✱ I216
🗑 TYPE LABEL **(A5)** I208 (LEVEL 3/4 ONLY)
ANTENNA BT **(A6)** ✱ I215
E-COVER ASSEMBLY **(A6)** I222
SCREW 1.6x4.5 I221
A6=D-COVER ASSEMBLY
(I211-I220)
🗑 = These parts can not be reused after removal.
Ver. 1.0
● ELECTRO ● SILICON ● METAL ● PLASTIC ● PWB ● COVER
✱ = only available as assembly

Mechanical parts list

Note: For product codes, please refer to the latest Service bulletin.

ITEM REF	QTY	PART NAME	COMMENTS
* =*Not available as spare part*			
A1	1	A-COVER ASSEMBLY(I001 - I003)	
I001	1	A-COVER DECORATION	Must be replaced after disassembly
I002*	1	A-COVER	
I003	1	MICROPHONE	
I004	1	FUNCTIONAL KEYMAT	
I005	4	SCREW 1.6x2.6 040-025124 P2912	
A2	1	UI SHIELD ASSEMBLY(I006 - I008)	
I006*	1	UI SHIELD	
I007	1	EARPIECE	
I008*	1	EARPIECE ADHESIVE	Must be replaced after disassembly
I009	1	LCD MODULE	
A3	1	1 TG UI MODULE ASSEMBLY(I010 - I011)	
I010	1	FUNCTIONAL DOMESHEET	Must be replaced after disassembly
I011*	1	1 TG UI MODULE	
1012	1	LCD ADAPTER RIGHT (5200 only)	
1013	1	LCD ADAPTER LEFT (5200 only)	
A4	1	SLIDE ASSEMBLY(I101 - I103)	
I101*	1	B-COVER	
I102*	1	SLIDE MECHANICS	
I103*	1	C-COVER	
I104	1	NUMERIC KEYMAT	
I105	1	SLIDE FLEX	
I106	1	SLIDE DECO PLATE ASSY	Must be replaced after disassembly
A5	1	1TF LIGHT SWAP ENGINE MODULE ASSY (I201 - I208)	
I201	1	NUMERIC DOMESHEET	Must be replaced after disassembly
I202	1	BT/FM SHIELDING LID	Must be replaced after disassembly
I203	1	HW ACC SHIELDING LID	Must be replaced after disassembly
I204*	1	1 TF ENGINE MODULE	

ITEM REF	QTY	PART NAME	COMMENTS
I205	1	RAP MEM SHIELDING LID	Must be replaced after disassembly
I206	1	RETU TAHVO SHIELDING LID	Must be replaced after disassembly
I207	1	RF SHIELDING LID	Must be replaced after disassembly
I208	1	TYPE LABEL	Must be replaced after disassembly
I209	1	CAMERA	
I210	1	CAMERA GASKET	Must be replaced after disassembly
A6	1	D-COVER ASSEMBLY(I211 - I220)	
I211*	1	D-COVER	
I212*	1	ANTENNA GSM	
I213*	1	GSM ANTENNA SPRING	
I214*	1	IHF SPEAKER	
I215*	1	ANTENNA BT	
I216*	1	BT ANTENNA SPRING	
I217	1	DC-JACK	
I218	1	POWER KEY	
I219*	3	SIDEKEY AXIS	
I220	1	LABEL COVER	
I221	2	SCREW 1.6X4.5 TORX PLUS 61P G6	
I222	1	E-COVER ASSEMBLY	

Swap units

Table 6 RM-146/147 Swap phones

Note: For product codes, please refer to the latest Service bulletin.

Swap phones
RM-146 SWAP TRX EURO-C RED LATIN
RM-146 SWAP TRX EURO-C DARK GREY LATIN
RM-146 SWAP TRX EURO-C FRANCE RED LATIN
RM-146 EURO-C FRANCE DARK GREY LATIN
RM-146 SWAP TRX EURO-C TURKEY RED LATIN
RM-146 SWAP TRX EURO-C TURK DARKGREY LAT
RM-146 SWAP TRX EURO-F RED HEBREW
RM-146 SWAP TRX EURO-F DARK GREY HEBREW
RM-146 SWAP TRX EURO-H RED GREEK
RM-146 SWAP TRX EURO-H DARK GREY GREEK

Swap phones
RM-146 SWAP TRX EURO-I UKR RED CYRILLIC
RM-146 SWAP TRX EURO-I UKR DARK GREY CYR
RM-146 SWAP TRX EURO-I RU RED CYRILLIC
RM-146 SWAP TRX EURO-I RU DARK GREY CYR
RM-146 SWAP TRX MEA-1 RED ARABIC
RM-146 SWAP TRX MEA-1 DARK GREY ARABIC
RM-146 SWAP TRX MEA-13 RED LATIN
RM-146 SWAP TRX MEA-13 DARK GREY LATIN

Table 7 RM-146/147 Light swap

Note: For product codes, please refer to the latest Service bulletin.

Light swap
RM-146 LIGHT SWAP ENGINE APAC-U
RM-146 LIGHT SWAP ENGINE APAC-T PHILLIPINES
RM-146 LIGHT SWAP ENGINE CHINA-R
RM-146 LIGHT SWAP ENGINE CHINA-P TAIWAN
RM-146 LIGHT SWAP ENGINE EURO-C
RM-146 LIGHT SWAP ENGINE EURO-C FRANCE
RM-146 LIGHT SWAP ENGINE EURO-C TURKEY
RM-146 LIGHT SWAP ENGINE EURO-I UKRAINE
RM-146 LIGHT SWAP ENGINE EURO-I RUSSIA
RM-146 LIGHT SWAP ENGINE MEA-13 SA

Table 8 RM-174/181 Swap phones

Note: For product codes, please refer to the latest Service bulletin.

Swap phones
RM-174 SWAP TRX EURO-C RED LATIN
RM-174 SWAP TRX EURO-C LIGHTBLUE LATIN
RM-174 SWAP TRX EURO-C FRANCE RED LATIN
RM-174 SWAP TRX EURO-C FRANCE LIGHTBLUE LATIN
RM-174 SWAP TRX EURO-C TURKEY RED LATIN
RM-174 SWAP TRX EURO-C TURK LIGHTBLUE LAT
RM-174 SWAP TRX EURO-F RED HEBREW
RM-174 SWAP TRX EURO-F LIGHTBLUE HEBREW
RM-174 SWAP TRX EURO-H RED GREEK

Swap phones
RM-174 SWAP TRX EURO-H LIGHTBLUE GREEK
RM-174 SWAP TRX EURO-I UKR RED CYRILLIC
RM-174 SWAP TRX EURO-I UKR LIGHTBLUE CYR
RM-174 SWAP TRX EURO-I RU RED CYRILLIC
RM-174 SWAP TRX EURO-I RU LIGHTBLUE CYR
RM-174 SWAP TRX MEA-1 RED ARABIC
RM-174 SWAP TRX MEA-1 LIGHTBLUE ARABIC
RM-174 SWAP TRX MEA-13 SA RED LATIN
RM-174 SWAP TRX MEA-13 SA LIGHTBLUE LATIN

Table 9 RM-174/181 Light swap

Note: For product codes, please refer to the latest Service bulletin.

Light swap
RM-174 LIGHT SWAP ENGINE EURO-C
RM-174 LIGHT SWAP ENGINE EURO-C FRANCE
RM-174 LIGHT SWAP ENGINE EURO-C TURKEY
RM-174 LIGHT SWAP ENGINE EURO-I UKRAINE
RM-174 LIGHT SWAP ENGINE EURO-I RUSSIA
RM-174 LIGHT SWAP ENGINE MEA-13 SA
RM-174 LIGHT SWAP ENGINE APAC-U
RM-174 LIGHT SWAP ENGINE APAC-T PHILLIPINES
RM-174 LIGHT SWAP ENGINE APAC-R
RM-174 LIGHT SWAP ENGINE APAC-P TAIWAN

RM-146/147 Component parts list

Table 10 RM-146/147 Component parts list

Note: For product codes, please refer to the latest Service bulletin.

Ref	Side	X	Y	Object name	EMEA & LTA	APAC & China
A2400	B	K	4	RETU TAHVO SHIELD ASSY 040-025976 P2912	X	X
A2800	B	K	8	RAP_MEM SHIELD ASSY 040-025979 P2912	X	X
A3300	T	E	8	HW_ACC ASSEMBLY 040-025020 P2912	X	X
A6150	T	C	5	BT/FM SHIELDING ASSY 040-020979 P2730	X	X
A7000	B	P	6	RF ASSEMBLY 040-009342 P2465	X	X
B2200	B	M	4	CRYSTAL 32.768KHZ +/-30PPM 12.5PF	X	X
C2000	T	C	2	CHIPCAP NP0 27P J 50V 0402	X	X

Ref	Side	X	Y	Object name	EMEA & LTA	APAC & China
C2008	T	D	7	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2017	T	C	3	CHIPCAP X5R 470N K 25V 0603	X	X
C2031	T	I	2	CHIPCAP X7R 10N K 16V 0402	X	X
C2032	T	E	3	CHIPCAP X7R 10N K 16V 0402	X	X
C2033	T	I	2	CHIPCAP X7R 33N K 10V 0402	X	X
C2034	T	I	3	CHIPCAP X7R 33N K 10V 0402	X	X
C2035	T	F	3	CHIPCAP NP0 27P J 50V 0402	X	X
C2040	T	I	2	CHIPCAP X5R 2U2 K 6V3 0603	X	X
C2041	T	I	3	CHIPCAP X5R 2U2 K 6V3 0603	X	X
C2042	T	H	3	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2043	T	H	3	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2044	T	D	3	CHIPCAP NP0 18P J 50V 0402	X	X
C2045	T	D	3	CHIPCAP NP0 18P J 50V 0402	X	X
C2047	T	I	3	CHIPCAP X5R 4U7 K 6.3V 0603	X	X
C2048	T	I	3	CHIPCAP X5R 2U2 K 6V3 0603	X	X
C2049	T	J	3	CHIPCAP X5R 1U K 6V3 0603	X	X
C2051	T	J	3	CHIPCAP X5R 1U K 6V3 0603	X	X
C2070	B	N	5	CHIPTCAP 150U M 10V 6X3.2X1.5	X	X
C2071	B	N	3	CHIPCAP NP0 27P J 50V 0402	X	X
C2073	B	N	3	CHIPCAP X5R 1U K 6V3 0603	X	X
C2074	B	N	3	CHIPCAP X7R 10N K 16V 0402	X	X
C2100	T	G	3	CHIPCAP X7R 33N K 10V 0402	X	X
C2101	T	G	3	CHIPCAP X7R 33N K 10V 0402	X	X
C2102	T	H	3	CHIPCAP X5R 2U2 K 6V3 0603	X	X
C2105	T	G	3	CHIPCAP X7R 33N K 10V 0402	X	X
C2200	B	L	5	CHIPCAP X5R 1U K 6V3 0603	X	X
C2201	B	L	3	CHIPCAP X5R 1U K 6V3 0603	X	X
C2202	B	M	2	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2203	B	M	4	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2204	B	M	4	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2205	B	M	5	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2206	B	M	4	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2207	B	M	3	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2208	B	M	4	CHIPCAP NP0 27P J 50V 0402	X	X

Ref	Side	X	Y	Object name	EMEA & LTA	APAC & China
C2209	B	M	4	CHIPCAP NP0 27P J 50V 0402	X	X
C2210	B	K	3	CHIPCAP X5R 1U K 16V 0603	X	X
C2211	B	K	3	CHIPCAP X5R 4U7 K 10V 0805	X	X
C2212	B	K	4	CHIPCAP X5R 1U5 K 4V 0402	X	X
C2213	B	L	3	CHIPCAP X5R 1U5 K 4V 0402	X	X
C2214	B	L	3	CHIPCAP X5R 1U5 K 4V 0402	X	X
C2215	B	K	3	CHIPCAP X5R 1U5 K 4V 0402	X	X
C2216	B	K	3	CHIPCAP X5R 1U5 K 4V 0402	X	X
C2217	B	M	3	CHIPCAP X5R 1U5 K 4V 0402	X	X
C2219	B	M	3	CHIPCAP X5R 1U5 K 4V 0402	X	X
C2220	B	K	4	CHIPCAP X5R 1U5 K 4V 0402	X	X
C2221	B	K	2	CHIPCAP X5R 1U K 6V3 0603	X	X
C2222	B	K	3	CHIPCAP X5R 1U K 6V3 0603	X	X
C2223	B	K	5	CHIPCAP X7R 10N K 16V 0402	X	X
C2224	B	L	5	CHIPCAP X7R 10N K 16V 0402	X	X
C2225	B	L	3	CHIPCAP X5R 1U K 6V3 0603	X	X
C2226	B	K	3	CHIPCAP X5R 1U K 6V3 0603	X	X
C2227	B	K	4	CHIPCAP X5R 1U K 6V3 0603	X	X
C2228	B	L	3	CHIPCAP X5R 1U K 6V3 0603	X	X
C2230	B	L	3	CHIPCAP X5R 1U K 6V3 0603	X	X
C2231	B	K	5	CHIPCAP X5R 10U M 6V3 0805	X	X
C2232	B	K	3	CHIPCAP X5R 1U K 6V3 0603	X	X
C2270	B	K	5	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2271	B	K	5	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2272	B	L	5	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2273	B	K	4	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2274	B	K	4	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2275	B	K	5	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2281	B	L	2	CHIPCAP X5R 1U K 6V3 0603	X	X
C2300	B	I	5	CHIPCAP X7R 10N K 16V 0402	X	X
C2301	B	I	5	CHIPCAP X5R 22U M 6V3 0805	X	X
C2302	B	J	5	CHIPCAP X5R 22U M 6V3 0805	X	X
C2303	B	I	3	CHIPCAP X5R 1U K 6V3 0603	X	X
C2304	B	J	4	CHIPCAP X7R 10N K 16V 0402	X	X

Ref	Side	X	Y	Object name	EMEA & LTA	APAC & China
C2306	B	I	4	CHIPCAP X5R 1U K 6V3 0603	X	X
C2307	B	I	4	CHIPCAP X5R 1U K 6V3 0603	X	X
C2309	B	I	5	CHIPCAP X5R 22U M 6V3 0805	X	X
C2312	B	I	4	CHIPCAP X5R 1U K 6V3 0603	X	X
C2313	B	I	3	CHIPCAP X5R 1U K 6V3 0603	X	X
C2314	B	J	3	CHIPCAP X5R 4U7 K 10V 0805	X	X
C2315	B	J	2	CHIPCAP X5R 4U7 M 25V 0805	X	X
C2401	T	H	7	CHIPCAP NP0 27P J 50V 0402	X	X
C2403	T	C	8	CHIPCAP NP0 47P J 50V 0402	X	X
C2407	T	E	4	CHIPCAP NP0 27P J 50V 0402	X	X
C2408	T	E	4	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2409	T	E	5	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2410	T	F	2	CHIPCAP NP0 27P J 50V 0402	X	X
C2411	T	F	2	CHIPCAP NP0 27P J 50V 0402	X	X
C2412	T	F	7	CHIP ARRAY NP0 4x22pF K 16V 0508	X	X
C2413	B	I	2	CHIPCAP NP0 27P J 50V 0402	X	X
C2414	T	E	6	CHIPCAP NP0 27P J 50V 0402	X	X
C2415	T	H	9	CHIPCAP X7R 10N K 16V 0402	X	X
C2416	T	F	6	CHIPCAP NP0 27P J 50V 0402	X	X
C2417	T	H	6	CHIPCAP NP0 27P J 50V 0402	X	X
C2421	T	E	4	CHIPCAP NP0 27P J 50V 0402	X	X
C2422	T	G	6	CHIPCAP NP0 27P J 50V 0402	X	X
C2423	T	E	5	CHIPCAP NP0 27P J 50V 0402	X	X
C2424	T	G	6	CHIPCAP NP0 27P J 50V 0402	X	X
C2425	T	E	5	CHIPCAP NP0 27P J 50V 0402	X	X
C2426	T	E	5	CHIPCAP NP0 27P J 50V 0402	X	X
C2427	T	F	6	CHIPCAP NP0 27P J 50V 0402	X	X
C2428	T	G	6	CHIPCAP NP0 27P J 50V 0402	X	X
C2600	B	M	10	CHIPCAP X5R 4U7 K 6V3 0805	X	X
C2601	B	Q	9	CHIPCAP NP0 27P J 50V 0402	X	X
C2602	B	Q	10	CHIPCAP X5R 100N K 16V 0402	X	X
C2603	B	Q	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2700	B	H	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2800	B	L	9	CHIPCAP X5R 100N K 16V 0402	X	X

Ref	Side	X	Y	Object name	EMEA & LTA	APAC & China
C2801	B	N	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2802	B	M	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2803	B	L	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2804	B	N	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2805	B	K	6	CHIPCAP X5R 100N K 16V 0402	X	X
C2807	B	N	9	CHIPCAP X5R 1U K 6V3 0603	X	X
C2808	B	M	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2809	B	M	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2810	B	K	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2811	B	K	7	CHIPCAP X5R 100N K 16V 0402	X	X
C2812	B	L	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2813	B	N	6	CHIPCAP X5R 100N K 16V 0402	X	X
C2814	B	M	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2815	B	K	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2816	B	K	9	CHIPCAP NP0 27P J 50V 0402	X	X
C2818	B	K	7	CHIPCAP X5R 100N K 16V 0402	X	X
C2819	B	K	8	CHIPCAP X5R 100N K 16V 0402	X	X
C2820	B	N	7	CHIPCAP X5R 100N K 16V 0402	X	X
C2821	B	N	7	CHIPCAP NP0 27P J 50V 0402	X	X
C3000	B	I	6	CHIPCAP X5R 100N K 16V 0402	X	X
C3001	B	J	6	CHIPCAP X7R 10N K 16V 0402	X	X
C3002	B	J	6	CHIPCAP X5R 100N K 16V 0402	X	X
C3003	B	K	9	CHIPCAP X7R 10N K 16V 0402	X	X
C3004	B	K	9	CHIPCAP X5R 100N K 16V 0402	X	X
C3005	B	J	9	CHIPCAP X5R 100N K 16V 0402	X	X
C3006	B	I	9	CHIPCAP X5R 100N K 16V 0402	X	X
C3007	B	J	9	CHIPCAP X7R 10N K 16V 0402	X	X
C3008	B	J	9	CHIPCAP X5R 100N K 16V 0402	X	X
C3009	B	I	9	CHIPCAP X5R 100N K 16V 0402	X	X
C3200	B	G	6	CHIPCAP X5R 100N K 16V 0402	X	X
C3201	B	G	6	CHIPCAP X5R 1U K 6V3 0402	X	X
C3202	B	G	7	CHIPCAP X7R 10N K 16V 0402	X	X
C3203	B	G	6	CHIPCAP X5R 1U K 6V3 0402	X	X
C3210	T	G	3	CHIPCAP NP0 47P J 50V 0402	X	X

Ref	Side	X	Y	Object name	EMEA & LTA	APAC & China
C3242	B	F	6	CHIPCAP X7R 33N K 10V 0402	X	X
C3300	T	D	9	CHIPCAP X5R 100N K 16V 0402	X	X
C3301	T	D	7	CHIPCAP X5R 100N K 16V 0402	X	X
C3302	T	D	7	CHIPCAP X5R 220N K 6.3V 0402	X	X
C3303	T	E	7	CHIPCAP X5R 100N K 16V 0402	X	X
C3304	T	D	8	CHIPCAP X7R 10N K 16V 0402	X	X
C3305	T	D	8	CHIPCAP X5R 4U7 K 6.3V 0603	X	X
C3306	T	F	7	CHIPCAP X5R 4U7 K 6.3V 0603	X	X
C3307	T	F	8	CHIPCAP X5R 10UF 6V3 0603	X	X
C3308	T	E	7	CHIPCAP X5R 1U K 6V3 0402	X	X
C3309	T	D	7	CHIPCAP NP0 27P J 50V 0402	X	X
C3310	T	D	9	CHIPCAP NP0 27P J 50V 0402	X	X
C3313	T	E	7	CHIPCAP X7R 10N K 16V 0402	X	X
C3314	T	D	8	CHIPCAP X7R 10N K 16V 0402	X	X
C6002	B	B	3	CHIPCAP NP0 1P0 C 50V 0402	X	X
C6031	T	C	3	CHIPCAP NP0 18P J 50V 0402	X	X
C6032	T	B	5	CHIPCAP NP0 100P J 50V 0402	X	X
C6033	T	B	5	CHIPCAP X7R 10N K 16V 0402	X	X
C6034	T	B	4	CHIPCAP X7R 10N K 16V 0402	X	X
C6035	T	C	5	CHIPCAP X7R 10N K 16V 0402	X	X
C6036	T	C	5	CHIPCAP X7R 10N K 16V 0402	X	X
C6037	T	C	5	CHIPCAP X5R 1U5 K 4V 0402	X	X
C6038	T	C	4	CHIPCAP X7R 10N K 16V 0402	X	X
C6039	T	B	4	CHIPCAP NP0 18P J 50V 0402	X	X
C6051	T	B	4	CHIPCAP NP0 2P7 C 50V 0402	X	X
C6052	T	C	4	CHIPCAP NP0 2P7 C 50V 0402	X	X
C6055	T	B	4	CHIPCAP X5R 1U K 6V3 0603	X	X
C6157	T	C	7	CHIPCAP X7R 10N K 16V 0402	X	X
C6158	T	C	7	CHIPCAP X5R 100N K 16V 0402	X	X
C6159	T	C	6	CHIPCAP X7R 33N K 10V 0402	X	X
C6162	T	C	7	CHIPCAP X7R 33N K 10V 0402	X	X
C6163	T	B	6	CHIPCAP X7R 33N K 10V 0402	X	X
C6165	T	C	6	CHIPCAP X7R 33N K 10V 0402	X	X
C6170	T	B	7	CHIPCAP X7R 10N K 16V 0402	X	X

Ref	Side	X	Y	Object name	EMEA & LTA	APAC & China
C6176	T	B	6	CHIPCAP NP0 100P J 50V 0402	X	X
C6178	T	B	6	CHIPCAP NP0 27P J 50V 0402	X	X
C6179	T	B	6	CHIPCAP NP0 47P J 50V 0402	X	X
C6188	T	C	6	CHIPCAP X5R 100N K 16V 0402	X	X
C6189	T	C	6	CHIPCAP X5R 100N K 16V 0402	X	X
C6190	T	C	7	CHIPCAP X5R 100N K 16V 0402	X	X
C6191	T	C	7	CHIPCAP X5R 100N K 16V 0402	X	X
C7501	B	O	7	CHIPCAP NP0 2P7 C 50V 0402	X	X
C7503	B	Q	8	CHIPCAP X5R 1U K 6V3 0603	X	X
C7504	B	O	7	CHIPCAP X5R 1U K 6V3 0603	X	X
C7505	B	Q	8	CHIPCAP X5R 1U K 6V3 0402	X	X
C7506	B	Q	8	CHIPCAP X5R 1U K 6V3 0402	X	X
C7507	B	Q	8	CHIPCAP X7R 10N K 16V 0402	X	X
C7508	B	Q	7	CHIPCAP NP0 18P J 50V 0402	X	X
C7509	B	Q	8	CHIPCAP X7R 10N K 16V 0402	X	X
C7511	B	P	8	CHIPCAP NP0 2N2 G 16V 0603	X	X
C7513	B	Q	8	CHIPCAP X7R 10N K 16V 0402	X	X
C7515	B	O	8	CHIPCAP NP0 4P7 C 50V 0402	X	X
C7516	B	P	8	CHIPCAP NP0 470P J 6V3 0402	X	X
C7518	B	Q	7	CHIPCAP X5R 100N K 16V 0402	X	X
C7520	B	O	4	CHIPCAP NP0 3P3 C 50V 0402	X	X
C7521	B	O	4	CHIPCAP NP0 1P5 C 50V 0402	X	X
C7522	B	Q	4	CHIPCAP NP0 1P8 C 50V 0402	X	X
C7525	B	Q	3	CHIPCAP NP0 18P J 50V 0402	X	X
C7561	B	Q	8	CHIPCAP X7R 680P J 50V 0402	X	X
C7562	B	Q	6	CHIPCAP NP0 22P J 50V 0402	X	X
C7563	B	Q	7	CHIPCAP NP0 12P J 50V 0402	X	X
C7564	B	O	8	CHIPCAP X7R 10N K 16V 0402	X	X
C7565	B	Q	7	CHIPCAP NP0 12P J 50V 0402	X	X
C7566	B	Q	8	CHIPCAP NP0 4P7 C 50V 0402	X	
D2200	B	L	4	RETU 3.02 LF TSA1GJWE TFBGA108	X	X
D2800	B	M	8	RAPGSM PA v1.1 LF C027 uBGA289	X	X
D3000	B	J	8	COMBO 256M NOR + 128M DDR DRAM FBGA133	X	X
D3300	T	E	8	HW ACCELERATOR STV0984N	X	X

Ref	Side	X	Y	Object name	EMEA & LTA	APAC & China
E2001	B	B	4	PICK&PLACE PAD 1.2x1.8 P2730	X	X
E2002	B	B	4	PICK&PLACE PAD 1.2x1.8 P2730	X	X
E2101	B	O	9	IHF-CLIP 040-029193 P2912	X	X
E2102	B	P	9	IHF-CLIP 040-029193 P2912	X	X
F2000	T	C	3	SM FUSE FF 2A 32V 0402	X	X
G2200	T	J	7	RTC BACKUP CAPAC 311 SIZE FOR 2.6V 4UAH	X	X
G7500	B	O	8	VCO 3296-3980MHZ 4-BAND	X	X
G7501	B	Q	8	VCTCXO 38.4MHZ 2.5V 2MA	X	X
L2000	T	C	2	FERR.BEAD 220R/100M 2A 0R05 0603	X	X
L2030	T	E	3	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X
L2031	T	E	3	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X
L2032	T	D	3	CHIP COIL 68NH J Q12/100MHZ 0603	X	X
L2033	T	E	3	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X
L2100	T	H	7	CHIP BEAD ARRAY 2X1000R 0R75 0405	X	X
L2102	B	N	9	CHIP COIL 56N J Q38/200MHZ 0603	X	X
L2103	B	O	9	CHIP COIL 56N J Q38/200MHZ 0603	X	X
L2202	B	L	2	FERR.BEAD 220R/100M 2A 0R05 0603	X	X
L2203	B	L	2	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X
L2204	B	L	2	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X
L2205	B	L	2	FERR.BEAD 220R/100M 2A 0R05 0603	X	X
L2206	B	K	2	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X
L2207	B	M	5	FERR.BEAD 240R/100M 0.4A 0R4 0402	X	X
L2208	B	M	5	FERR.BEAD 240R/100M 0.4A 0R4 0402	X	X
L2209	B	M	5	FERR.BEAD 240R/100M 0.4A 0R4 0402	X	X
L2210	B	M	5	FERR.BEAD 240R/100M 0.4A 0R4 0402	X	X
L2270	B	K	5	FERR.BEAD 220R/100M 2A 0R05 0603	X	X
L2271	B	L	5	FERR.BEAD 220R/100M 2A 0R05 0603	X	X
L2272	B	K	4	FERR.BEAD 220R/100M 2A 0R05 0603	X	X
L2273	B	K	5	FERR.BEAD 220R/100M 2A 0R05 0603	X	X
L2301	B	H	5	FERR.BEAD 220R/100M 2A 0R05 0603	X	X
L2302	B	J	5	INDUCT WW 10U 0A65 0R35 4X4X1.2	X	X
L2304	B	I	3	CHOKE 22U M 0R7 0.35A 3.0X3.0X1.5	X	X
L2305	B	H	3	FERR.BEAD 240R/100M 0.4A 0R4 0402	X	X
L2306	B	H	4	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X

Ref	Side	X	Y	Object name	EMEA & LTA	APAC & China
L2400	T	E	5	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X
L2401	T	E	4	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X
L2402	T	G	2	CHIP BEAD ARRAY 2X1000R 0R75 0405	X	X
L2403	B	I	2	FERR.BEAD 240R/100M 0.4A 0R4 0402	X	X
L3200	B	G	6	FERR.BEAD 240R/100M 0.4A 0R4 0402	X	X
L3301	T	E	7	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X
L3303	T	F	8	INDUCT WW 2.2UH 1A2 310 case size	X	X
L6030	T	C	4	CHIP COIL 2N7 +-0N3 Q29/800M 0402	X	X
L6031	T	C	4	CHIP COIL 2N7 +-0N3 Q29/800M 0402	X	X
L6032	T	C	4	CHIP COIL 22N J Q28/800MHZ 0402	X	X
L6077	T	B	3	FERR.BEAD 240R/100M 0.4A 0R4 0402	X	X
L6156	T	C	7	CHIP COIL 47N G Q38/200MHz 0603	X	X
L6176	T	B	6	CHIP COIL 120N J Q32/150MHZ 0603	X	X
L7010	B	O	7	FERR.BEAD 240R/100M 0.4A 0R4 0402	X	X
L7011	B	O	6	FERR.BEAD 240R/100M 0.4A 0R4 0402	X	X
L7500	B	P	6	CHIP COIL 12N J Q31/800MHZ 0402	X	X
L7501	B	P	5	CHIP COIL 12N J Q31/800MHZ 0402	X	X
L7502	B	Q	7	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X
L7504	B	P	6	CHIP COIL 27N J Q27/800MHZ 0402		X
L7504				CHIP COIL 22N J Q28/800MHZ 0402	X	
L7505	B	P	5	CHIP COIL 22N J Q28/800MHZ 0402	X	
L7505				CHIP COIL 33N J Q23/800MHZ 0402		X
L7515	B	P	8	CHIP COIL 15N J Q30/800MHZ 0402	X	X
L7561	B	Q	6	CHIP COIL 470NH J 0603	X	X
N2030	T	F	3	IC ANALOGUE SWITCH LOW THRESHOLD CSP07	X	X
N2031	T	I	3	ST HEADPHONE AMPLIFIER LM4920 uSMD14	X	X
N2300	B	I	4	TAHVO v5.2 LF TFBGA84	X	X
N2301	B	J	2	WHITE LED DRIVER 4LEDS 500mW 8bump USMD8	X	X
N2400	T	H	8	SENSOR HALL IC SWITCH HED55XXU12	X	X
N2401	T	H	3	TRX2+RX4 PEMD9 N&P 10K/47K 0W12 SOT666	X	X
N2600	B	P	10	IRDA GP2W1302YP 1.152Mbit/s 2.4V	X	X
N3200	B	G	6	VREG & LEVELSHIFT(LP3928)USMD16	X	X
N3300	T	F	8	DC/DC CONV LM3671TLX-1.82V uSMD5	X	X
N6030	T	C	5	BC4-ROM1.0RDL	X	X

Ref	Side	X	Y	Object name	EMEA & LTA	APAC & China
N6156	T	C	6	FM RECEIVER TEA5761UK N4B (Ti) CSP	X	X
N7505	B	P	7	AHNE401A TRANSCEIVER TFBGA144	X	X
N7520	B	P	4	PA RF9282E6.5 GSM/EDGE 850/900/1800/1900	X	X
R2007	T	D	6	ASIP SILIC USB OTG / ESD BGA11	X	X
R2008	T	D	6	CHIPRES 0W06 220K J 0402	X	X
R2033	T	F	3	CHIPRES 0W06 10K J 0402	X	X
R2034	T	F	3	CHIPRES 0W06 100R J 0402	X	X
R2035	T	E	3	CHIPRES 0W06 100K J 0402	X	X
R2036	T	E	3	CHIPRES 0W06 10K J 0402	X	X
R2037	T	I	3	ASIP MIC W/ESD RES+CAP+ZDI BGA11	X	X
R2044	T	I	2	CHIPRES 0W06 220R J 0402	X	X
R2045	T	I	2	CHIPRES 0W06 1K0 J 0402	X	X
R2049	T	H	3	CHIPRES 0W06 15R J 0402	X	X
R2050	T	H	3	CHIPRES 0W06 15R J 0402	X	X
R2051	T	E	3	ASIP 4XESD *** PB-FREE *** BGA5	X	X
R2070	B	M	3	CHIP VARISTOR VWM14V VC50V 0402	X	X
R2100	T	G	3	ASIP SINGLE ENDED MICROPHONE INTERF BGA8	X	X
R2101	T	H	3	CHIPRES 0W06 220R J 0402	X	X
R2102	T	H	6	CHIPRES JUMPER 0R0 0402	X	X
R2103	T	H	7	CHIPRES JUMPER 0R0 0402	X	X
R2104	T	G	7	CHIP VARISTOR VWM14V VC50V 0402	X	X
R2105	T	G	7	CHIP VARISTOR VWM14V VC50V 0402	X	X
R2106	B	N	8	CHIP VARISTOR VWM14V VC50V 0402	X	X
R2107	B	O	8	CHIP VARISTOR VWM14V VC50V 0402	X	X
R2108	B	E	4	CHIP VARISTOR VWM14V VC50V 0402	X	X
R2109	B	E	4	CHIP VARISTOR VWM14V VC50V 0402	X	X
R2113	T	G	3	CHIPRES 0W06 10K J 0402	X	X
R2114	T	G	3	CHIPRES 0W06 120K J 0402	X	X
R2115	T	G	3	CHIPRES 0W06 220K J 0402	X	X
R2200	B	M	2	CHIPRES 0W06 100K J 0402	X	X
R2201	B	M	3	CHIPRES 0W06 120K J 0402	X	X
R2202	B	L	5	CHIPRES 0W06 1K0 J 0402	X	X
R2203	B	L	5	CHIPRES 0W06 1K0 J 0402	X	X
R2204	B	L	5	CHIPRES 0W06 1K0 J 0402	X	X

Ref	Side	X	Y	Object name	EMEA & LTA	APAC & China
R2205	B	L	5	CHIPRES 0W06 1K0 J 0402	X	X
R2212	B	L	5	CHIPRES 0W06 470R J 0402	X	X
R2213	B	M	3	CHIPRES 0W06 4K7 J 0402	X	X
R2214	B	M	2	CHIPRES 0W06 4K7 J 0402	X	X
R2216	B	M	3	CHIPRES 0W06 2M2 J 0402	X	X
R2250	B	M	5	CHIPRES 0W06 100K J 0402	X	X
R2251	B	M	5	CHIPRES 0W06 27K J 0402		X
R2303	B	H	4	CHIPRES JUMPER 0R0 0603	X	X
R2401	T	H	8	CHIPRES 0W06 100K J 0402	X	X
R2402	T	H	8	CHIPRES 0W06 220R J 0402	X	X
R2403	T	G	7	CHIP VARISTOR VWM14V VC50V 0402	X	X
R2404	T	C	8	CHIP VARISTOR VWM14V VC50V 0402	X	X
R2406	T	C	8	CHIPRES 0W06 27K J 0402	X	X
R2407	T	E	6	CHIPRES 0W06 150R J 0402	X	X
R2408	T	E	6	CHIPRES 0W06 22K J 0402	X	X
R2411	T	G	6	RES NETWORK 0W03 4X100R J 0804	X	X
R2412	T	G	6	RES NETWORK 0W03 4X100R J 0804	X	X
R2413	T	F	6	CHIPRES 0W06 33R J 0402	X	X
R2414	T	F	6	RES NETWORK 0W06 4X33R J 0804	X	X
R2415	T	E	7	CHIPRES 0W06 100R J 0402	X	X
R2416	T	E	7	CHIPRES 0W06 10K J 0402	X	X
R2417	B	E	6	NTC RES 0W1 47K J B 4050+-3% 0402	X	X
R2418	T	Q	10	CHIPRES 0W06 100R J 0402	X	X
R2419	T	M	10	CHIPRES 0W06 100R J 0402	X	X
R2420	T	G	6	CHIPRES 0W06 33R J 0402	X	X
R2421	B	J	3	CHIPRES 0W06 33R J 0402	X	X
R2423	T	E	6	CHIPRES 0W06 22K J 0402	X	X
R2600	B	N	10	CHIPRES 0W125 4R7 J 0805	X	X
R2700	B	H	9	ASIP SIM INTERFACE **low cap** BGA8	X	X
R2803	B	L	9	CHIPRES 0W06 100R J 0402	X	X
R2804	B	L	9	CHIPRES 0W06 100R J 0402	X	X
R2830	B	N	8	CHIPRES 0W06 10R J 0402	X	X
R2840	B	F	7	CHIPRES 0W06 100K J 0402	X	X
R3000	B	J	6	CHIPRES 0W06 4K7 J 0402	X	X

Ref	Side	X	Y	Object name	EMEA & LTA	APAC & China
R3002	B	L	9	CHIPRES 0W06 10R J 0402	X	X
R3003	B	K	7	CHIPRES 0W06 4K7 J 0402	X	X
R3004	B	K	8	CHIPRES 0W06 4K7 J 0402	X	X
R3200	B	G	6	ASIP MMC FILTER *** PB-FREE ***	X	X
R3201	B	G	7	CHIPRES 0W06 22K J 0402	X	X
R3202	B	G	7	CHIPRES 0W06 22K J 0402	X	X
R3203	B	F	7	CHIPRES 0W06 1K2 J 0402	X	X
R3204	B	F	7	CHIPRES 0W06 680R J 0402	X	X
R3242	B	F	6	CHIPRES 0W06 100K J 0402	X	X
R3243	B	F	6	CHIPRES 0W06 4K7 J 0402	X	X
R3300	T	D	9	CHIPRES 0W06 4K7 J 0402	X	X
R3301	T	E	9	CHIPRES 0W06 4K7 J 0402	X	X
R3312	T	G	8	CHIPRES 0W06 1K0 J 0402	X	X
R3313	T	G	7	CHIPRES 0W06 1K0 J 0402	X	X
R3314	T	E	7	CHIPRES 0W06 47R J 0402	X	X
R6002	B	B	3	CHIPRES JUMPER 0R0 0402	X	X
R6030	T	B	5	CHIPRES 0W06 10K J 0402	X	X
R6031	T	C	4	CHIPRES 0W06 10K J 0402	X	X
R6032	T	C	5	CHIPRES 0W06 2R2 J 0402	X	X
R6034	T	B	4	CHIPRES 0W06 10K J 0402	X	X
R6037	T	C	4	CHIPRES 0W06 100K J 0402	X	X
R6159	T	B	7	CHIPRES 0W06 10K J 0402	X	X
R6160	T	B	7	CHIPRES 0W06 100K J 0402	X	X
R7000	B	Q	3	CHIPRES JUMPER 0R0 0603	X	X
R7501	B	P	8	CHIPRES 0W06 2K2 J 0402	X	X
R7502	B	O	6	CHIPRES 0W06 10K F 0402	X	X
R7503	B	Q	7	CHIPRES 0W06 4K7 J 0402	X	X
R7505	B	P	8	CHIPRES 0W06 8K2 F 0402	X	X
R7506	B	Q	7	CHIPRES 0W06 10R J 0402	X	X
R7507	B	O	7	CHIPRES 0W06 10R J 0402	X	X
R7508	B	Q	8	CHIPRES 0W06 10R J 0402	X	X
R7509	B	Q	8	CHIPRES 0W06 22K J 0402	X	X
R7510	B	Q	3	CHIPRES 0W06 15R J 0402	X	X
R7522	B	Q	4	CHIPRES 0W06 27K J 0402	X	X

Ref	Side	X	Y	Object name	EMEA & LTA	APAC & China
R7523	B	O	4	CHIPRES JUMPER 0R0 0402	X	X
R7560	B	Q	6	CHIPRES 0W06 120R J 0402	X	X
S2401	T	F	10	SM SW TACT SPST 12V SIDE KEY 2.2N	X	X
S2402	T	I	10	SM SW TACT SPST 12V SIDE KEY 2.2N	X	X
S2403	B	B	8	SWITCH TACT SPST 15V 20MA HARD KNOB	X	X
S2404	B	L	10	SM SW TACT SPST 12V SIDE KEY 2.2N	X	X
T7501	B	P	8	TRANSF BALUN 3800 +/- 550MHZ 0805	X	X
T7520	B	O	3	TRANSF BALUN 1800+-100MHZ 2X1.25	X	X
V2000	T	C	3	ASIP TVS BGA4	X	X
V2401	T	E	6	TRX2 BIPOLAR 2XPNP 40V 0A1 0W12 SOT666	X	X
V2402	T	F	6	TR NPN RBE4K7/47K 50V 0A08 VMT3	X	X
V2403	T	E	7	TRX2 BIPOLAR 2XPNP 40V 0A1 0W12 SOT666	X	X
V2404	T	P	2	LED BLUE 11-53MCD 5MA 90DEG 0603	X	X
V2405	T	N	2	LED BLUE 11-53MCD 5MA 90DEG 0603	X	X
V2406	T	P	10	LED BLUE 11-53MCD 5MA 90DEG 0603	X	X
V2407	T	N	10	LED BLUE 11-53MCD 5MA 90DEG 0603	X	X
X2002	B	B	4	CONN USB 5POL MINI-USB B TYPE P0.8	X	X
X2030	B	D	3	SMD AV CONNECTOR d2.5mm	X	X
X2070	B	N	4	SM BATTERY CONN 3POL SPR 12V 2A	X	X
X2402	T	E	5	SM B2B 2X20 P0.4 F 30V 0.3A	X	X
X2700	B	F	8	CONN SIM SM 6POL P2.54 H1.05	X	X
X3200	B	F	3	CONN SMC TRANSFLASH MMC	X	X
X3300	B	C	8	SMIA85 SOCKET	X	X
X7000	B	P	2	SM CONN RF JACK 50R 2W 6GHZ	X	X
Z2001	T	D	7	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X
Z2400	T	G	8	ASIP 10-CH ESD EMI FILTER BGA25	X	X
Z6030	T	C	3	LTCC FILT 2441.75+-41.75MHZ 2.5X2	X	X
Z7001	B	Q	3	CHIPRES JUMPER 0R0 0402	X	X
Z7501	B	P	5	DUAL RX SAW FILTER 1800/1900 MHz 2016	X	
Z7501				SAW FILT DUAL 1842.5/1960MHZ 2.0x1.6mm		X
Z7503	B	Q	5	SAW MODULE TX GSM 850/900MHz 4.5x3.2	X	
Z7503				TX SAW MODULE GSM 850/900MHz		X
Z7504	B	P	5	DUAL RX SAW FILTER 850/900 MHz 2016	X	
Z7504				SAW FILT DUAL 850/900MHz 2.0x1.6x0.74		X

Ref	Side	X	Y	Object name	EMEA & LTA	APAC & China
Z7520	B	0	5	FERRITE BEAD 0R01 28R/100MHZ 0603	X	X
				SMD VIBRA MOTOR 1.3V 90MA 9000RPM	X	X
				NUMERIC DOMESHEET 040-025082 P2912	X	X
				PWB RIGID 1TF 83.3X43.2X1.0 M8 4/PA	X	X

RM-174/181 Component parts list

Table 11 RM-174/181 Component parts list

Note: For product codes, please refer to the latest Service bulletin.

Ref	Side	X	Y	Object name	APAC, China & EMEA	LTA & NAM
A2400	B	K	4	RETU TAHVO SHIELD ASSY 040-025976 P2912	X	X
A2800	B	K	8	RAP_MEM SHIELD ASSY 040-025979 P2912	X	X
A6150	T	C	5	BT/FM SHIELDING ASSY 040-020979 P2730	X	X
A7000	B	P	6	RF ASSEMBLY 040-009342 P2465	X	X
B2200	B	M	4	CRYSTAL 32.768KHZ +/-30PPM 12.5PF	X	X
C2000	T	C	2	CHIPCAP NP0 27P J 50V 0402	X	X
C2008	T	D	7	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2017	T	C	3	CHIPCAP X5R 470N K 25V 0603	X	X
C2031	T	I	2	CHIPCAP X7R 10N K 16V 0402	X	X
C2032	T	E	3	CHIPCAP X7R 10N K 16V 0402	X	X
C2033	T	I	2	CHIPCAP X7R 33N K 10V 0402	X	X
C2034	T	I	3	CHIPCAP X7R 33N K 10V 0402	X	X
C2035	T	F	3	CHIPCAP NP0 27P J 50V 0402	X	X
C2040	T	I	2	CHIPCAP X5R 2U2 K 6V3 0603	X	X
C2041	T	I	3	CHIPCAP X5R 2U2 K 6V3 0603	X	X
C2042	T	H	3	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2043	T	H	3	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2044	T	D	3	CHIPCAP NP0 18P J 50V 0402	X	X
C2045	T	D	3	CHIPCAP NP0 18P J 50V 0402	X	X
C2047	T	I	3	CHIPCAP X5R 4U7 K 6.3V 0603	X	X
C2048	T	I	3	CHIPCAP X5R 2U2 K 6V3 0603	X	X
C2049	T	J	3	CHIPCAP X5R 1U K 6V3 0603	X	X
C2051	T	J	3	CHIPCAP X5R 1U K 6V3 0603	X	X
C2070	B	N	5	CHIPTCAP 150U M 10V 6X3.2X1.5	X	X

Ref	Side	X	Y	Object name	APAC, China & EMEA	LTA & NAM
C2071	B	N	3	CHIPCAP NP0 27P J 50V 0402	X	X
C2073	B	N	3	CHIPCAP X5R 1U K 6V3 0603	X	X
C2074	B	N	3	CHIPCAP X7R 10N K 16V 0402	X	X
C2100	T	G	3	CHIPCAP X7R 33N K 10V 0402	X	X
C2101	T	G	3	CHIPCAP X7R 33N K 10V 0402	X	X
C2102	T	H	3	CHIPCAP X5R 2U2 K 6V3 0603	X	X
C2105	T	G	3	CHIPCAP X7R 33N K 10V 0402	X	X
C2200	B	O	8	CHIPCAP X5R 1U K 6V3 0603	X	X
C2201	B	L	5	CHIPCAP X5R 1U K 6V3 0603	X	X
C2202	B	L	3	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2203	B	M	4	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2204	B	M	4	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2205	B	M	5	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2206	B	M	4	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2207	B	M	3	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2208	B	M	4	CHIPCAP NP0 27P J 50V 0402	X	X
C2209	B	M	4	CHIPCAP NP0 27P J 50V 0402	X	X
C2210	B	K	3	CHIPCAP X5R 1U K 16V 0603	X	X
C2211	B	K	3	CHIPCAP X5R 4U7 K 10V 0805	X	X
C2212	B	K	4	CHIPCAP X5R 1U5 K 4V 0402	X	X
C2213	B	L	3	CHIPCAP X5R 1U5 K 4V 0402	X	X
C2214	B	L	3	CHIPCAP X5R 1U5 K 4V 0402	X	X
C2215	B	K	3	CHIPCAP X5R 1U5 K 4V 0402	X	X
C2216	B	K	3	CHIPCAP X5R 1U5 K 4V 0402	X	X
C2217	B	M	3	CHIPCAP X5R 1U5 K 4V 0402	X	X
C2219	B	M	3	CHIPCAP X5R 1U5 K 4V 0402	X	X
C2220	B	K	4	CHIPCAP X5R 1U5 K 4V 0402	X	X
C2221	B	K	2	CHIPCAP X5R 1U K 6V3 0603	X	X
C2222	B	K	3	CHIPCAP X5R 1U K 6V3 0603	X	X
C2223	B	K	5	CHIPCAP X7R 10N K 16V 0402	X	X
C2224	B	L	5	CHIPCAP X7R 10N K 16V 0402	X	X
C2225	B	L	3	CHIPCAP X5R 1U K 6V3 0603	X	X
C2226	B	K	3	CHIPCAP X5R 1U K 6V3 0603	X	X

Ref	Side	X	Y	Object name	APAC, China & EMEA	LTA & NAM
C2227	B	K	4	CHIPCAP X5R 1U K 6V3 0603	X	X
C2228	B	L	3	CHIPCAP X5R 1U K 6V3 0603	X	X
C2230	B	L	3	CHIPCAP X5R 1U K 6V3 0603	X	X
C2231	B	K	5	CHIPCAP X5R 10U M 6V3 0805	X	X
C2232	B	K	3	CHIPCAP X5R 1U K 6V3 0603	X	X
C2270	B	K	5	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2271	B	K	5	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2272	B	L	5	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2273	B	K	4	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2274	B	K	4	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2275	B	K	5	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2281	B	L	2	CHIPCAP X5R 1U K 6V3 0603	X	X
C2300	B	I	5	CHIPCAP X7R 10N K 16V 0402	X	X
C2301	B	I	5	CHIPCAP X5R 22U M 6V3 0805	X	X
C2302	B	J	5	CHIPCAP X5R 22U M 6V3 0805	X	X
C2303	B	I	3	CHIPCAP X5R 1U K 6V3 0603	X	X
C2304	B	J	4	CHIPCAP X7R 10N K 16V 0402	X	X
C2306	B	I	4	CHIPCAP X5R 1U K 6V3 0603	X	X
C2307	B	I	4	CHIPCAP X5R 1U K 6V3 0603	X	X
C2309	B	I	5	CHIPCAP X5R 22U M 6V3 0805	X	X
C2312	B	I	4	CHIPCAP X5R 1U K 6V3 0603	X	X
C2313	B	I	3	CHIPCAP X5R 1U K 6V3 0603	X	X
C2314	B	J	3	CHIPCAP X5R 4U7 K 10V 0805	X	X
C2315	B	J	2	CHIPCAP X5R 4U7 M 25V 0805	X	X
C2401	T	H	7	CHIPCAP NP0 27P J 50V 0402	X	X
C2403	T	C	8	CHIPCAP NP0 47P J 50V 0402	X	X
C2408	T	E	4	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2409	T	E	5	CHIPCAP X7R 1N0 K 50V 0402	X	X
C2410	T	F	2	CHIPCAP NP0 27P J 50V 0402	X	X
C2411	T	F	2	CHIPCAP NP0 27P J 50V 0402	X	X
C2412	T	F	7	CHIP ARRAY NP0 4x22pF K 16V 0508	X	X
C2413	B	I	2	CHIPCAP NP0 27P J 50V 0402	X	X
C2414	T	E	6	CHIPCAP NP0 27P J 50V 0402	X	X

Ref	Side	X	Y	Object name	APAC, China & EMEA	LTA & NAM
C2415	T	H	9	CHIPCAP X7R 10N K 16V 0402	X	X
C2416	T	F	6	CHIPCAP NP0 27P J 50V 0402	X	X
C2417	T	H	6	CHIPCAP NP0 27P J 50V 0402	X	X
C2421	T	E	4	CHIPCAP NP0 27P J 50V 0402	X	X
C2422	T	G	6	CHIPCAP NP0 27P J 50V 0402	X	X
C2423	T	E	5	CHIPCAP NP0 27P J 50V 0402	X	X
C2424	T	G	6	CHIPCAP NP0 27P J 50V 0402	X	X
C2425	T	E	5	CHIPCAP NP0 27P J 50V 0402	X	X
C2426	T	E	5	CHIPCAP NP0 27P J 50V 0402	X	X
C2427	T	F	6	CHIPCAP NP0 27P J 50V 0402	X	X
C2428	T	G	6	CHIPCAP NP0 27P J 50V 0402	X	X
C2600	B	M	10	CHIPCAP X5R 4U7 K 6V3 0805	X	X
C2601	B	Q	9	CHIPCAP NP0 27P J 50V 0402	X	X
C2602	B	Q	10	CHIPCAP X5R 100N K 16V 0402	X	X
C2603	B	Q	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2700	B	H	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2800	B	L	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2801	B	N	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2802	B	M	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2803	B	L	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2804	B	N	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2805	B	K	6	CHIPCAP X5R 100N K 16V 0402	X	X
C2807	B	N	9	CHIPCAP X5R 1U K 6V3 0603	X	X
C2808	B	M	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2809	B	M	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2810	B	K	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2811	B	K	7	CHIPCAP X5R 100N K 16V 0402	X	X
C2812	B	L	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2813	B	N	6	CHIPCAP X5R 100N K 16V 0402	X	X
C2814	B	M	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2815	B	K	9	CHIPCAP X5R 100N K 16V 0402	X	X
C2816	B	K	9	CHIPCAP NP0 27P J 50V 0402	X	X
C2818	B	K	7	CHIPCAP X5R 100N K 16V 0402	X	X

Ref	Side	X	Y	Object name	APAC, China & EMEA	LTA & NAM
C2819	B	K	8	CHIPCAP X5R 100N K 16V 0402	X	X
C2820	B	N	7	CHIPCAP X5R 100N K 16V 0402	X	X
C2821	B	N	7	CHIPCAP NP0 27P J 50V 0402	X	X
C3000	B	I	6	CHIPCAP X5R 100N K 16V 0402	X	X
C3001	B	J	6	CHIPCAP X7R 10N K 16V 0402	X	X
C3002	B	J	6	CHIPCAP X5R 100N K 16V 0402	X	X
C3003	B	K	9	CHIPCAP X7R 10N K 16V 0402	X	X
C3004	B	K	9	CHIPCAP X5R 100N K 16V 0402	X	X
C3005	B	J	9	CHIPCAP X5R 100N K 16V 0402	X	X
C3006	B	I	9	CHIPCAP X5R 100N K 16V 0402	X	X
C3007	B	J	9	CHIPCAP X7R 10N K 16V 0402	X	X
C3008	B	J	9	CHIPCAP X5R 100N K 16V 0402	X	X
C3009	B	I	9	CHIPCAP X5R 100N K 16V 0402	X	X
C3200	B	G	6	CHIPCAP X5R 100N K 16V 0402	X	X
C3201	B	G	6	CHIPCAP X5R 1U K 6V3 0402	X	X
C3202	B	G	7	CHIPCAP X7R 10N K 16V 0402	X	X
C3203	B	G	6	CHIPCAP X5R 1U K 6V3 0402	X	X
C3210	T	G	3	CHIPCAP NP0 47P J 50V 0402	X	X
C3242	B	F	6	CHIPCAP X7R 33N K 10V 0402	X	X
C3300	T	C	9	CHIPCAP X5R 100N K 16V 0402	X	X
C3301	T	C	8	CHIPCAP X5R 100N K 16V 0402	X	X
C3302	T	C	8	CHIPCAP X5R 100N K 10V 0402	X	X
C3309	T	C	8	CHIPCAP NP0 27P J 50V 0402	X	X
C3310	T	C	9	CHIPCAP NP0 27P J 50V 0402	X	X
C6002	B	B	3	CHIPCAP NP0 1P0 C 50V 0402	X	X
C6031	T	C	3	CHIPCAP NP0 18P J 50V 0402	X	X
C6032	T	B	5	CHIPCAP NP0 100P J 50V 0402	X	X
C6033	T	B	5	CHIPCAP X7R 10N K 16V 0402	X	X
C6034	T	B	4	CHIPCAP X7R 10N K 16V 0402	X	X
C6035	T	C	5	CHIPCAP X7R 10N K 16V 0402	X	X
C6036	T	C	5	CHIPCAP X7R 10N K 16V 0402	X	X
C6037	T	C	5	CHIPCAP X5R 1U5 K 4V 0402	X	X
C6038	T	C	4	CHIPCAP X7R 10N K 16V 0402	X	X

Ref	Side	X	Y	Object name	APAC, China & EMEA	LTA & NAM
C6039	T	B	4	CHIPCAP NP0 18P J 50V 0402	X	X
C6051	T	B	4	CHIPCAP NP0 2P7 C 50V 0402	X	X
C6052	T	C	4	CHIPCAP NP0 2P7 C 50V 0402	X	X
C6055	T	B	4	CHIPCAP X5R 1U K 6V3 0603	X	X
C6157	T	C	7	CHIPCAP X7R 10N K 16V 0402	X	X
C6158	T	C	7	CHIPCAP X5R 100N K 16V 0402	X	X
C6159	T	C	6	CHIPCAP X7R 33N K 10V 0402	X	X
C6162	T	C	7	CHIPCAP X7R 33N K 10V 0402	X	X
C6163	T	B	6	CHIPCAP X7R 33N K 10V 0402	X	X
C6165	T	C	6	CHIPCAP X7R 33N K 10V 0402	X	X
C6170	T	B	7	CHIPCAP X7R 10N K 16V 0402	X	X
C6176	T	B	6	CHIPCAP NP0 100P J 50V 0402	X	X
C6178	T	B	6	CHIPCAP NP0 27P J 50V 0402	X	X
C6179	T	B	6	CHIPCAP NP0 47P J 50V 0402	X	X
C6188	T	C	6	CHIPCAP X5R 100N K 16V 0402	X	X
C6189	T	C	6	CHIPCAP X5R 100N K 16V 0402	X	X
C6190	T	C	7	CHIPCAP X5R 100N K 16V 0402	X	X
C6191	T	C	7	CHIPCAP X5R 100N K 16V 0402	X	X
C7501	B	O	7	CHIPCAP NP0 2P7 C 50V 0402	X	X
C7503	B	Q	8	CHIPCAP X5R 1U K 6V3 0603	X	X
C7504	B	O	7	CHIPCAP X5R 1U K 6V3 0603	X	X
C7505	B	Q	8	CHIPCAP X5R 1U K 6V3 0402	X	X
C7506	B	Q	8	CHIPCAP X5R 1U K 6V3 0402	X	X
C7507	B	Q	8	CHIPCAP X7R 10N K 16V 0402	X	X
C7508	B	Q	7	CHIPCAP NP0 18P J 50V 0402	X	X
C7509	B	Q	8	CHIPCAP X7R 10N K 16V 0402	X	X
C7511	B	P	8	CHIPCAP NP0 2N2 G 16V 0603	X	X
C7513	B	Q	8	CHIPCAP X7R 10N K 16V 0402	X	X
C7515	B	O	8	CHIPCAP NP0 4P7 C 50V 0402	X	X
C7516	B	P	8	CHIPCAP NP0 470P J 50V 0402	X	X
C7518	B	Q	7	CHIPCAP X5R 100N K 16V 0402	X	X
C7520	B	O	4	CHIPCAP NP0 3P3 C 50V 0402	X	X
C7521	B	O	4	CHIPCAP NP0 1P5 C 50V 0402	X	X

Ref	Side	X	Y	Object name	APAC, China & EMEA	LTA & NAM
C7522	B	Q	4	CHIPCAP NP0 1P8 C 50V 0402	X	X
C7525	B	Q	3	CHIPCAP NP0 18P J 50V 0402	X	X
C7561	B	Q	8	CHIPCAP X7R 680P J 50V 0402	X	X
C7562	B	Q	6	CHIPCAP NP0 22P J 50V 0402	X	X
C7563	B	Q	7	CHIPCAP NP0 12P J 50V 0402	X	X
C7564	B	O	8	CHIPCAP X7R 10N K 16V 0402	X	X
C7565	B	Q	7	CHIPCAP NP0 12P J 50V 0402	X	X
C7566	B	Q	8	CHIPCAP NP0 4P7 C 50V 0402	X	X
D2200	B	L	4	RETU 3.02 LF TSA1GJWE TFBGA108	X	X
D2800	B	M	8	RAPGSM PA v1.1 LF C027 uBGA289	X	X
D3000	B	J	8	COMBO 256M NOR + 128M DDR DRAM FBGA133	X	X
E2001	B	B	4	PICK&PLACE PAD 1.2x1.8 P2730	X	X
E2002	B	B	4	PICK&PLACE PAD 1.2x1.8 P2730	X	X
E2101	B	O	9	IHF-CLIP 040-029193 P2912	X	X
E2102	B	P	9	IHF-CLIP 040-029193 P2912	X	X
F2000	T	C	3	SM FUSE FF 2A 32V 0402	X	X
G2200	T	J	7	RTC BACKUP CAPAC 311 SIZE FOR 2.6V 4UAH	X	X
G7500	B	O	8	VCO 3296-3980MHZ 4-BAND		X
G7501	B	Q	8	VCTCXO 38.4MHZ 2.5V 2MA	X	X
L2000	T	C	2	FERR.BEAD 220R/100M 2A 0R05 0603	X	X
L2030	T	E	3	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X
L2031	T	E	3	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X
L2032	T	D	3	CHIP COIL 68NH J Q12/100MHZ 0603	X	X
L2033	T	E	3	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X
L2100	T	H	7	CHIP BEAD ARRAY 2X1000R 0R75 0405	X	X
L2102	B	N	9	CHIP COIL 56N J Q38/200MHZ 0603	X	X
L2103	B	O	9	CHIP COIL 56N J Q38/200MHZ 0603	X	X
L2202	B	L	2	FERR.BEAD 220R/100M 2A 0R05 0603	X	X
L2203	B	L	2	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X
L2204	B	L	2	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X
L2205	B	L	2	FERR.BEAD 220R/100M 2A 0R05 0603	X	X
L2206	B	K	2	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X
L2207	B	M	5	FERR.BEAD 240R/100M 0.4A 0R4 0402	X	X

Ref	Side	X	Y	Object name	APAC, China & EMEA	LTA & NAM
L2208	B	M	5	FERR.BEAD 240R/100M 0.4A 0R4 0402	X	X
L2209	B	M	5	FERR.BEAD 240R/100M 0.4A 0R4 0402	X	X
L2210	B	M	5	FERR.BEAD 240R/100M 0.4A 0R4 0402	X	X
L2270	B	K	5	FERR.BEAD 220R/100M 2A 0R05 0603	X	X
L2271	B	L	5	FERR.BEAD 220R/100M 2A 0R05 0603	X	X
L2272	B	K	4	FERR.BEAD 220R/100M 2A 0R05 0603	X	X
L2273	B	K	5	FERR.BEAD 220R/100M 2A 0R05 0603	X	X
L2301	B	H	5	FERR.BEAD 220R/100M 2A 0R05 0603	X	X
L2302	B	J	5	INDUCT WW 10U 0A65 0R35 4X4X1.2	X	X
L2304	B	I	3	CHOKE 22U M 0R7 0.35A 3.0X3.0X1.5	X	X
L2305	B	H	3	FERR.BEAD 240R/100M 0.4A 0R4 0402	X	X
L2306	B	H	4	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X
L2400	T	E	5	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X
L2401	T	E	4	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X
L2402	T	G	2	CHIP BEAD ARRAY 2X1000R 0R75 0405	X	X
L2403	B	I	2	FERR.BEAD 240R/100M 0.4A 0R4 0402	X	X
L3200	B	G	6	FERR.BEAD 240R/100M 0.4A 0R4 0402	X	X
L3301	T	D	8	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X
L3302	T	C	9	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X
L6030	T	C	4	CHIP COIL 2N7 +-0N3 Q29/800M 0402	X	X
L6031	T	C	4	CHIP COIL 2N7 +-0N3 Q29/800M 0402	X	X
L6032	T	C	4	CHIP COIL 22N J Q28/800MHZ 0402	X	X
L6077	T	B	3	FERR.BEAD 240R/100M 0.4A 0R4 0402	X	X
L6156	T	C	7	CHIP COIL 47N G Q38/200MHz 0603	X	X
L6176	T	B	6	CHIP COIL 120N J Q32/150MHZ 0603	X	X
L7010	B	O	7	FERR.BEAD 240R/100M 0.4A 0R4 0402	X	X
L7011	B	O	6	FERR.BEAD 240R/100M 0.4A 0R4 0402	X	X
L7500	B	P	6	CHIP COIL 12N J Q31/800MHZ 0402	X	X
L7501	B	P	5	CHIP COIL 12N J Q31/800MHZ 0402	X	X
L7502	B	Q	7	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X
L7504	B	P	6	CHIP COIL 27N J Q27/800MHZ 0402		X
L7505	B	P	5	CHIP COIL 22N J Q28/800MHZ 0402	X	
L7505	B	P	5	CHIP COIL 33N J Q23/800MHZ 0402		X

Ref	Side	X	Y	Object name	APAC, China & EMEA	LTA & NAM
L7515	B	P	8	CHIP COIL 15N J Q30/800MHZ 0402	X	X
L7561	B	Q	6	CHIP COIL 470NH J 0603	X	X
L7594				CHIP COIL 22N J Q28/800MHZ 0402	X	
M2100	B	D	5	SMD VIBRA MOTOR 1.3V 90MA 9000RPM	X	X
N2030	T	F	3	IC ANALOGUE SWITCH LOW THRESHOLD CSP07	X	X
N2031	T	I	3	ST HEADPHONE AMPLIFIER LM4920 uSMD14	X	X
N2300	B	I	4	TAHVO v5.2 LF TFBGA84	X	X
N2301	B	J	2	WHITE LED DRIVER 4LEDS 500mW 8bump USMD8	X	X
N2400	T	H	8	SENSOR HALL IC SWITCH HED55XXU12	X	X
N2600	B	P	10	IRDA GP2W1302YP 1.152Mbit/s 2.4V	X	X
N3200	B	G	6	VREG & LEVELSHIFT(LP3928)USMD16	X	X
N6030	T	C	5	BC4-ROM1.0RDL	X	X
N6156	T	C	6	FM RECEIVER TEA5761UK N4B (Ti) CSP	X	X
N7505	B	P	7	AHNE401A TRANSCEIVER TFBGA144	X	X
N7520	B	P	4	PA RF9282E6.5 GSM/EDGE 850/900/1800/1900	X	X
R2007	T	D	6	ASIP SILIC USB OTG / ESD BGA11	X	X
R2008	T	D	6	CHIPRES 0W06 220K J 0402	X	X
R2033	T	F	3	CHIPRES 0W06 10K J 0402	X	X
R2034	T	F	3	CHIPRES 0W06 100R J 0402	X	X
R2035	T	E	3	CHIPRES 0W06 100K J 0402	X	X
R2036	T	E	3	CHIPRES 0W06 10K J 0402	X	X
R2037	T	I	3	ASIP MIC W/ESD RES+CAP+ZDI BGA11	X	X
R2044	T	I	2	CHIPRES 0W06 220R J 0402	X	X
R2045	T	I	2	CHIPRES 0W06 1K0 J 0402	X	X
R2049	T	H	3	CHIPRES 0W06 15R J 0402	X	X
R2050	T	H	3	CHIPRES 0W06 15R J 0402	X	X
R2051	T	E	3	ASIP 4XESD *** PB-FREE *** BGA5	X	X
R2070	B	M	3	CHIP VARISTOR VWM14V VC50V 0402	X	X
R2100	T	G	3	ASIP SINGLE ENDED MICROPHONE INTERF BGA8	X	X
R2101	T	H	3	CHIPRES 0W06 220R J 0402	X	X
R2102	T	H	6	CHIPRES JUMPER 0R0 0402	X	X
R2103	T	H	7	CHIPRES JUMPER 0R0 0402	X	X
R2104	T	G	7	CHIP VARISTOR VWM14V VC50V 0402	X	X

Ref	Side	X	Y	Object name	APAC, China & EMEA	LTA & NAM
R2105	T	G	7	CHIP VARISTOR VWM14V VC50V 0402	X	X
R2106	B	N	8	CHIP VARISTOR VWM14V VC50V 0402	X	X
R2107	B	O	8	CHIP VARISTOR VWM14V VC50V 0402	X	X
R2108	B	E	4	CHIP VARISTOR VWM14V VC50V 0402	X	X
R2109	B	E	4	CHIP VARISTOR VWM14V VC50V 0402	X	X
R2113	T	G	3	CHIPRES 0W06 10K J 0402	X	X
R2114	T	G	3	CHIPRES 0W06 120K J 0402	X	X
R2115	T	G	3	CHIPRES 0W06 220K J 0402	X	X
R2200	B	M	2	CHIPRES 0W06 100K J 0402	X	X
R2201	B	M	3	CHIPRES 0W06 120K J 0402	X	X
R2202	B	L	5	CHIPRES 0W06 1K0 J 0402	X	X
R2203	B	L	5	CHIPRES 0W06 1K0 J 0402	X	X
R2204	B	L	5	CHIPRES 0W06 1K0 J 0402	X	X
R2205	B	L	5	CHIPRES 0W06 1K0 J 0402	X	X
R2212	B	L	5	CHIPRES 0W06 470R J 0402	X	X
R2213	B	M	3	CHIPRES 0W06 4K7 J 0402	X	X
R2214	B	M	2	CHIPRES 0W06 4K7 J 0402	X	X
R2216	B	M	3	CHIPRES 0W06 2M2 J 0402	X	X
R2250	B	M	5	CHIPRES 0W06 100K J 0402	X	X
R2251	B	M	5	CHIPRES 0W06 27K J 0402		X
R2303	B	H	4	CHIPRES JUMPER 0R0 0603	X	X
R2401	T	H	8	CHIPRES 0W06 100K J 0402	X	X
R2402	T	H	8	CHIPRES 0W06 220R J 0402	X	X
R2403	T	G	7	CHIP VARISTOR VWM14V VC50V 0402	X	X
R2404	T	C	8	CHIP VARISTOR VWM14V VC50V 0402	X	X
R2406	T	C	8	CHIPRES 0W06 27K J 0402	X	X
R2407	T	E	6	CHIPRES 0W06 150R J 0402	X	X
R2408	T	E	6	CHIPRES 0W06 22K J 0402	X	X
R2411	T	G	6	RES NETWORK 0W03 4X100R J 0804	X	X
R2412	T	G	6	RES NETWORK 0W03 4X100R J 0804	X	X
R2413	T	F	6	CHIPRES 0W06 33R J 0402	X	X
R2414	T	F	6	RES NETWORK 0W06 4X33R J 0804	X	X
R2417	B	E	6	NTC RES 0W1 47K J B 4050+-3% 0402	X	X

Ref	Side	X	Y	Object name	APAC, China & EMEA	LTA & NAM
R2418	T	Q	10	CHIPRES 0W06 100R J 0402	X	X
R2419	T	M	10	CHIPRES 0W06 100R J 0402	X	X
R2420	T	G	6	CHIPRES 0W06 33R J 0402	X	X
R2421	B	J	3	CHIPRES 0W06 33R J 0402	X	X
R2422	T	H	3	CHIPRES JUMPER 0R0 0402	X	X
R2423	T	E	6	CHIPRES 0W06 22K J 0402	X	X
R2600	B	N	10	CHIPRES 0W125 4R7 J 0805	X	X
R2700	B	H	9	ASIP SIM INTERFACE **low cap** BGA8	X	X
R2803	B	L	9	CHIPRES 0W06 100R J 0402	X	X
R2804	B	L	9	CHIPRES 0W06 100R J 0402	X	X
R2830	B	N	8	CHIPRES 0W06 10R J 0402	X	X
R2840	B	F	7	CHIPRES 0W06 100K J 0402	X	X
R3000	B	J	6	CHIPRES 0W06 4K7 J 0402	X	X
R3002	B	L	9	CHIPRES 0W06 10R J 0402	X	X
R3003	B	K	7	CHIPRES 0W06 4K7 J 0402	X	X
R3004	B	K	8	CHIPRES 0W06 4K7 J 0402	X	X
R3200	B	G	6	ASIP MMC FILTER *** PB-FREE ***	X	X
R3201	B	G	7	CHIPRES 0W06 22K J 0402	X	X
R3202	B	G	7	CHIPRES 0W06 22K J 0402	X	X
R3203	B	F	7	CHIPRES 0W06 1K2 J 0402	X	X
R3204	B	F	7	CHIPRES 0W06 680R J 0402	X	X
R3242	B	F	6	CHIPRES 0W06 100K J 0402	X	X
R3243	B	F	6	CHIPRES 0W06 4K7 J 0402	X	X
R3312	T	G	8	CHIPRES 0W06 4K7 J 0402	X	X
R3313	T	G	7	CHIPRES 0W06 4K7 J 0402	X	X
R3314	T	D	8	CHIPRES 0W06 47R J 0402	X	X
R6002	B	B	3	CHIPRES JUMPER 0R0 0402	X	X
R6030	T	B	5	CHIPRES 0W06 10K J 0402	X	X
R6031	T	C	4	CHIPRES 0W06 10K J 0402	X	X
R6032	T	C	5	CHIPRES 0W06 2R2 J 0402	X	X
R6034	T	B	4	CHIPRES 0W06 10K J 0402	X	X
R6037	T	C	4	CHIPRES 0W06 100K J 0402	X	X
R6159	T	C	6	CHIPRES 0W06 10K J 0402	X	X

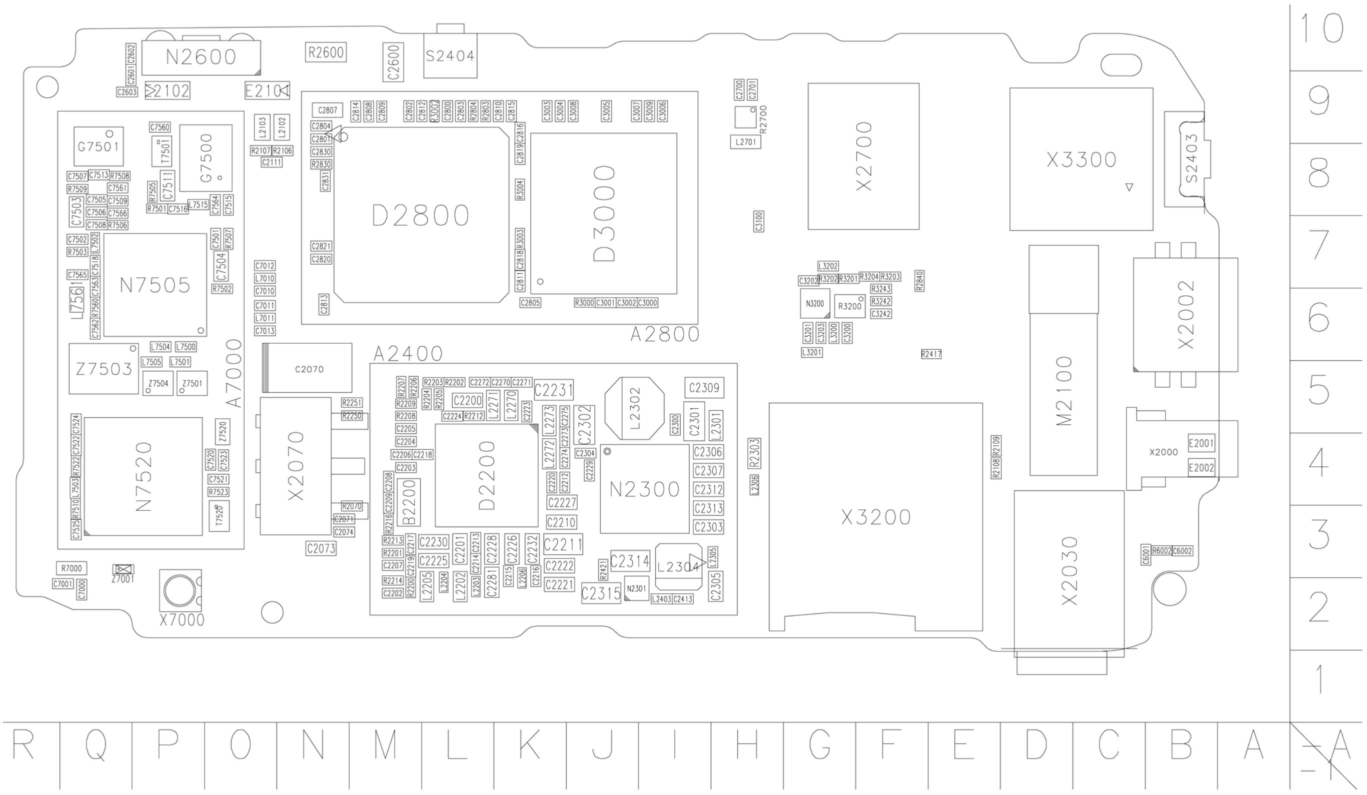
Ref	Side	X	Y	Object name	APAC, China & EMEA	LTA & NAM
R6160	T	B	7	CHIPRES 0W06 100K J 0402	X	X
R7000	B	Q	3	CHIPRES JUMPER 0R0 0603	X	X
R7501	B	P	8	CHIPRES 0W06 2K2 J 0402	X	X
R7502	B	O	6	CHIPRES 0W06 10K F 0402	X	X
R7503	B	Q	7	CHIPRES 0W06 4K7 J 0402	X	X
R7505	B	P	8	CHIPRES 0W06 8K2 F 0402	X	X
R7506	B	Q	7	CHIPRES 0W06 10R J 0402	X	X
R7507	B	O	7	CHIPRES 0W06 10R J 0402	X	X
R7508	B	Q	8	CHIPRES 0W06 10R J 0402	X	X
R7509	B	Q	8	CHIPRES 0W06 22K J 0402	X	X
R7510	B	Q	3	CHIPRES 0W06 15R J 0402	X	X
R7522	B	Q	4	CHIPRES 0W06 27K J 0402	X	X
R7523	B	O	4	CHIPRES JUMPER 0R0 0402	X	X
R7560	B	Q	6	CHIPRES 0W06 120R J 0402	X	X
S2401	T	F	10	SM SW TACT SPST 12V SIDE KEY 2.2N	X	X
S2402	T	I	10	SM SW TACT SPST 12V SIDE KEY 2.2N	X	X
S2403	B	B	8	SWITCH TACT SPST 15V 20MA HARD KNOB	X	X
S2404	B	L	10	SM SW TACT SPST 12V SIDE KEY 2.2N	X	X
T7501	B	P	8	TRANSF BALUN 3800 +/- 550MHZ 0805	X	X
T7520	B	O	3	TRANSF BALUN 1800+-100MHZ 2X1.25	X	X
V2000	T	C	3	ASIP TVS BGA4	X	X
V2401	T	E	6	TRX2 BIPOLAR 2XPNP 40V 0A1 0W12 SOT666	X	X
V2402	T	F	6	TR NPN RBE4K7/47K 50V 0A08 VMT3	X	X
V2404	T	P	2	LED BLUE 11-53MCD 5MA 90DEG 0603	X	X
V2405	T	N	2	LED BLUE 11-53MCD 5MA 90DEG 0603	X	X
V2406	T	P	10	LED BLUE 11-53MCD 5MA 90DEG 0603	X	X
V2407	T	N	10	LED BLUE 11-53MCD 5MA 90DEG 0603	X	X
X2002	B	B	6	CONN USB 5POL MINI-USB B TYPE P0.8	X	X
X2030	B	D	3	SMD AV CONNECTOR d2.5mm	X	X
X2070	B	N	4	SM BATTERY CONN 3POL SPR 12V 2A	X	X
X2402	T	E	5	SM B2B 2X20 P0.4 F 30V 0.3A	X	X
X2700	B	F	8	CONN SIM SM 6POL P2.54 H1.05	X	X
X3200	B	F	3	CONN SMC TRANSFLASH MMC	X	X

Ref	Side	X	Y	Object name	APAC, China & EMEA	LTA & NAM
X3300	B	C	8	SOCKET SMIA65 P0.95	X	X
X7000	B	P	2	SM CONN RF JACK 50R 2W 6GHZ	X	X
Z2001	T	D	7	FERRITE BEAD 0.6R 600R/100MZ 0402	X	X
Z2400	T	G	8	ASIP 10-CH ESD EMI FILTER BGA25	X	X
Z6030	T	C	3	LTCC FILT 2441.75+-41.75MHZ 2.5X2	X	X
Z7001	B	Q	3	CHIPRES JUMPER 0R0 0402	X	X
Z7501	B	P	5	DUAL RX SAW FILTER 1800/1900 MHz 2016	X	
Z7501	B	P	6	SAW FILT DUAL 1842.5/1960MHZ 2.0x1.6mm		X
Z7503	B	Q	5	SAW MODULE TX GSM 850/900MHz 4.5x3.2	X	
Z7503	B	Q	6	TX SAW MODULE GSM 850/900MHz		X
Z7504	B	P	5	DUAL RX SAW FILTER 850/900 MHz 2016	X	
Z7504	B	P	6	SAW FILT DUAL 850/900MHz 2.0x1.6x0.74		X
Z7520	B	O	5	FERRITE BEAD 0R01 28R/100MHZ 0603	X	X

Component layouts

Note: See also large scale layouts in the Schematics section.

Layouts for RM-146/147


N2600
R2600
C2600
S2404
N2102
E2104
G7501
G7500
D2800
D3000
A2800
X2700
X3300
S2403
X2002
M2100
X2000
E2001
E2002
N7505
Z7503
A7000
C2070
A2400
L2302
X2070
D2200
B2200
N2300
X3200
X2030
N7520
X7000
10
9
8
7
6
5
4
3
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1
R
Q
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O
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M
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K
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G
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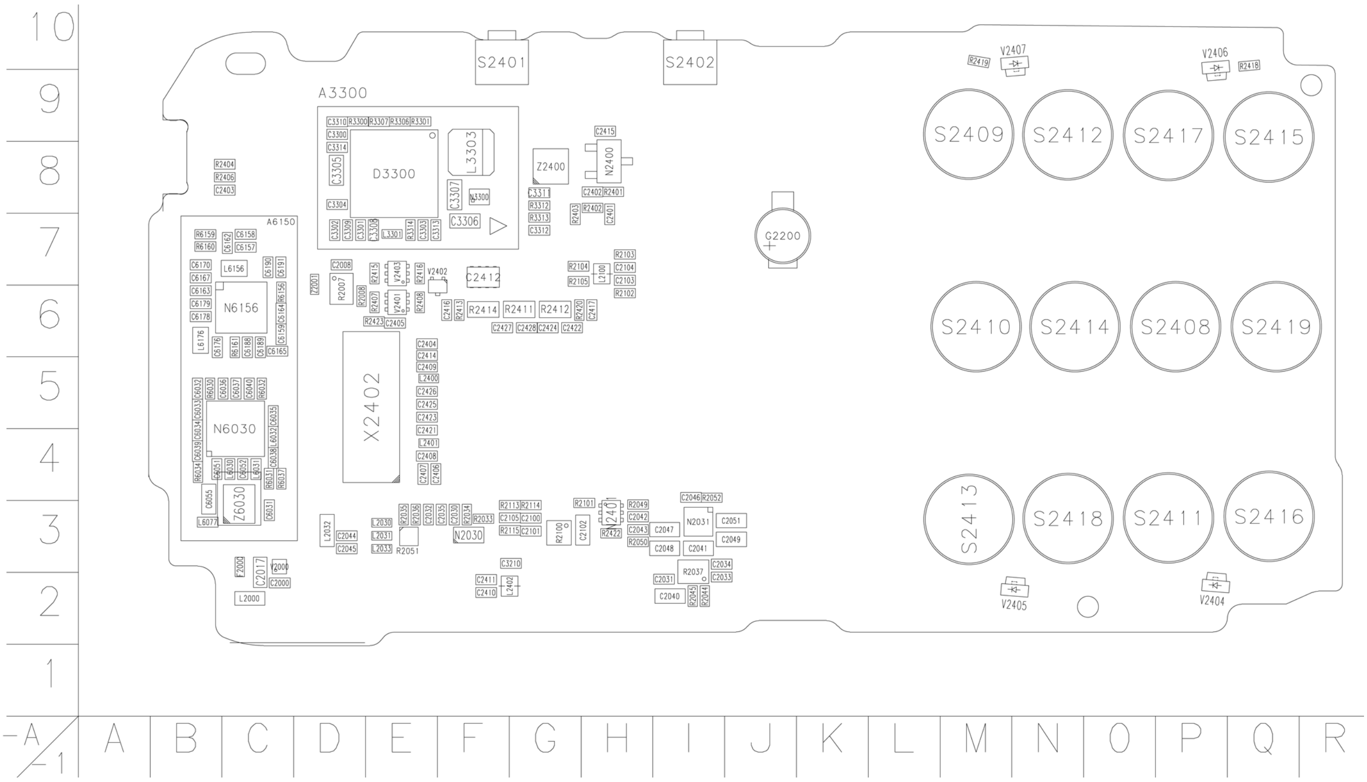
E
D
C
B
A

Figure 1 Main board layout, bottom side (1tfa_41a)


S2401
S2402
A3300
D3300
L3303
Z2400
N2400
G2200
A6150
N6156
N6030
X2402
C2412
N2030
N2031
S2409
S2412
S2417
S2415
S2410
S2414
S2408
S2419
S2413
S2418
S2411
S2416
V2407
V2406
V2405
V2404
10
9
8
7
6
5
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3
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1
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H
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M
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O
P
Q
R

Figure 2 Main board layout, top side (1tfa_41a)

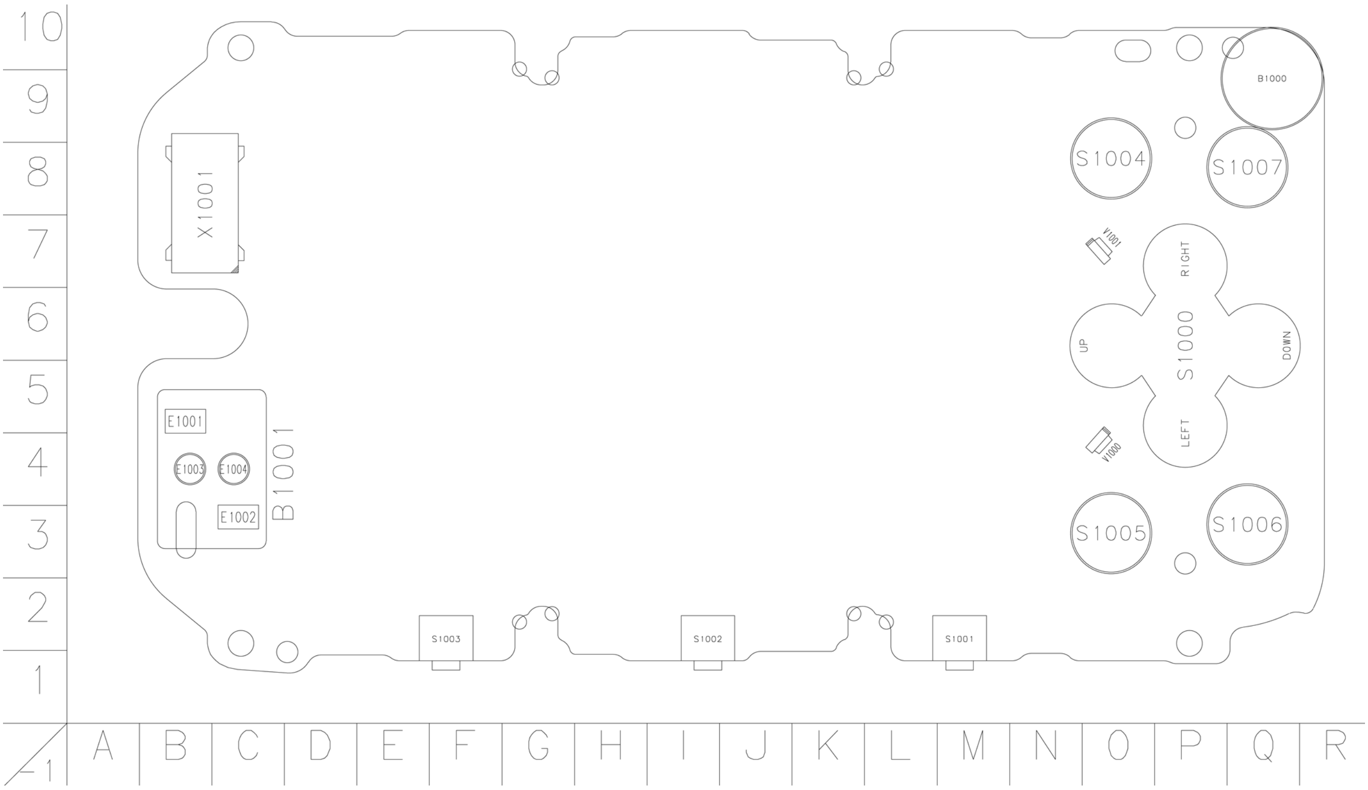

B1000
X1001
S1004
S1007
V1001
S1000
RIGHT
UP
DOWN
LEFT
V1000
E1001
E1003
E1004
E1002
B1001
S1005
S1006
S1003
S1002
S1001
10
9
8
7
6
5
4
3
2
1
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R

Figure 3 Top board layout, bottom side (1tga_41a)

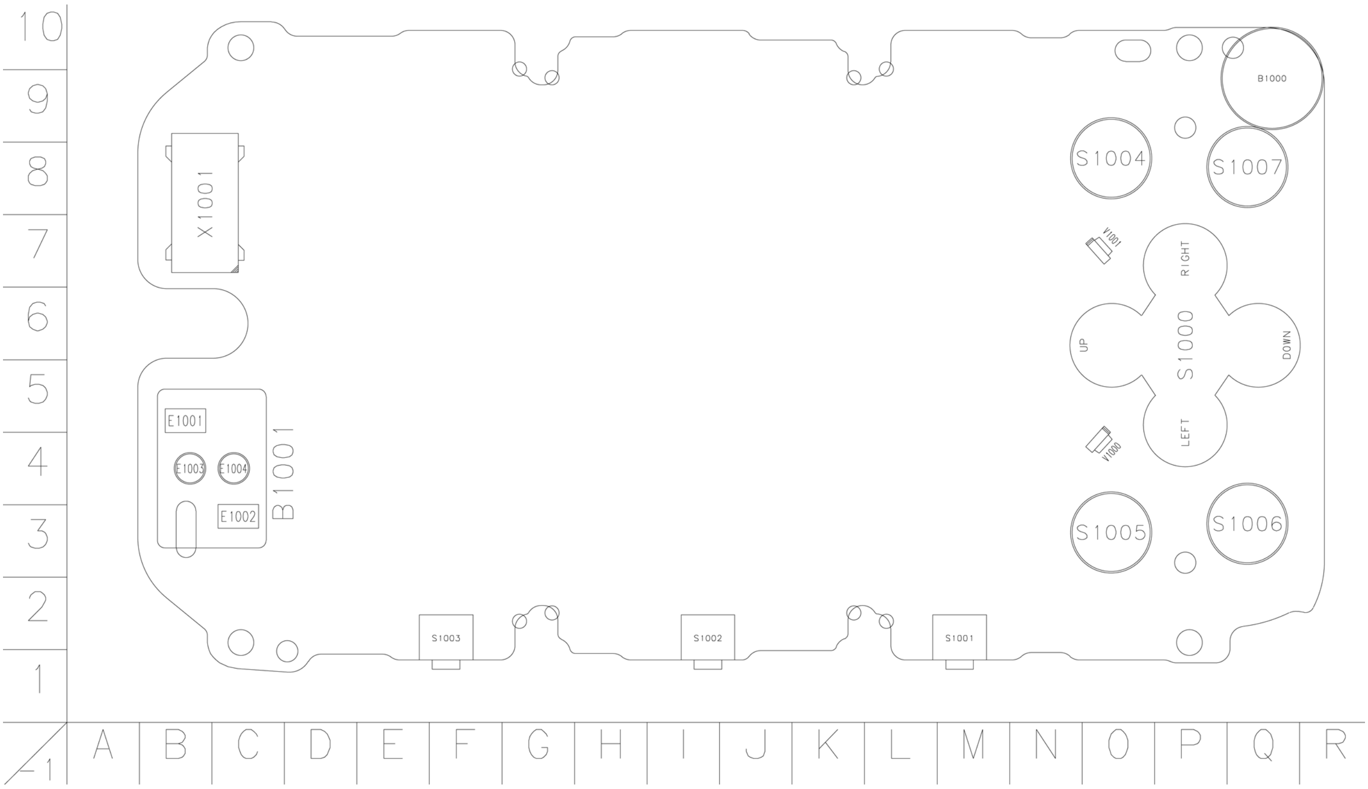

10
9
8
7
6
5
4
3
2
1
X1001
E1001
E1003
E1004
E1002
B1001
S1003
S1002
S1001
B1000
S1004
S1007
V1001
RIGHT
UP
S1000
DOWN
LEFT
V1000
S1005
S1006
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R

Figure 4 Top board layout, top side (1tga_41a)

Layouts for RM-174/181

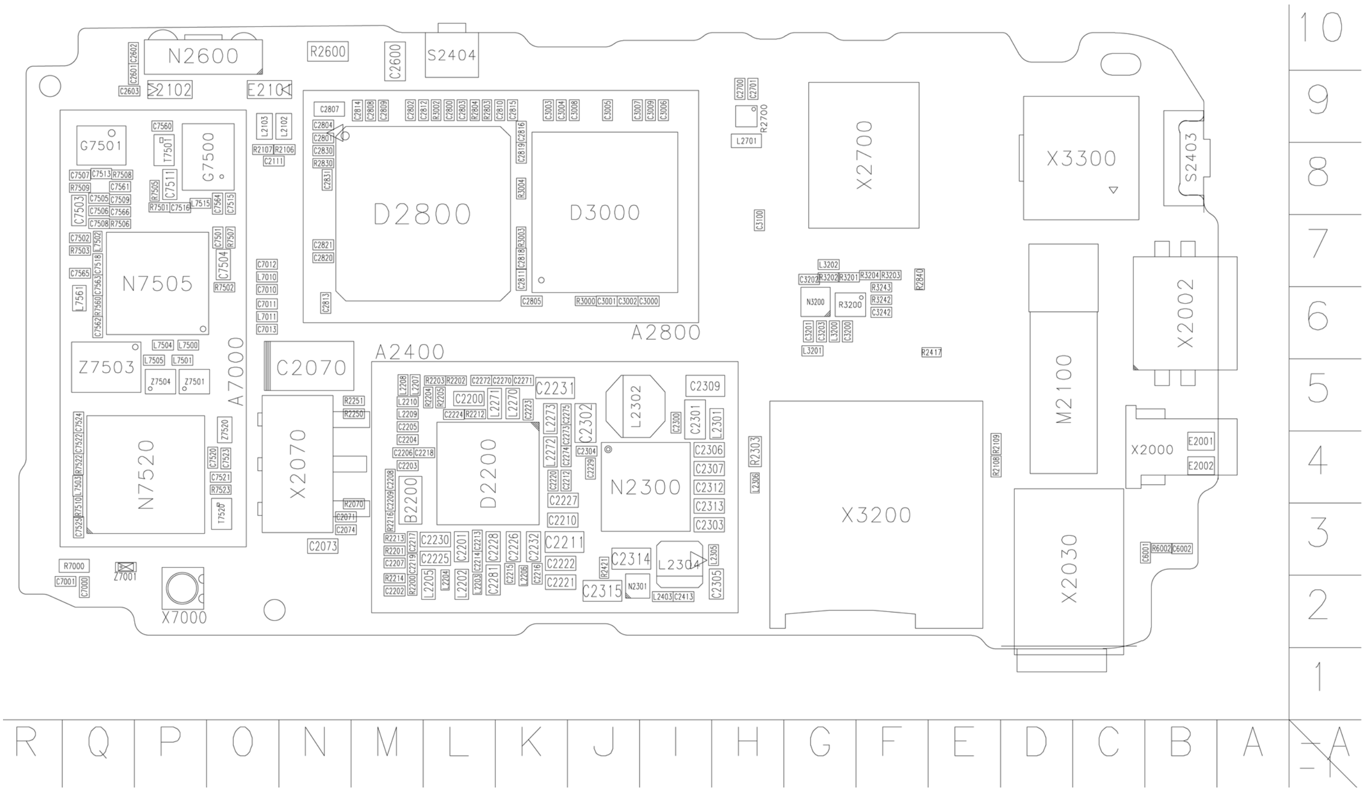
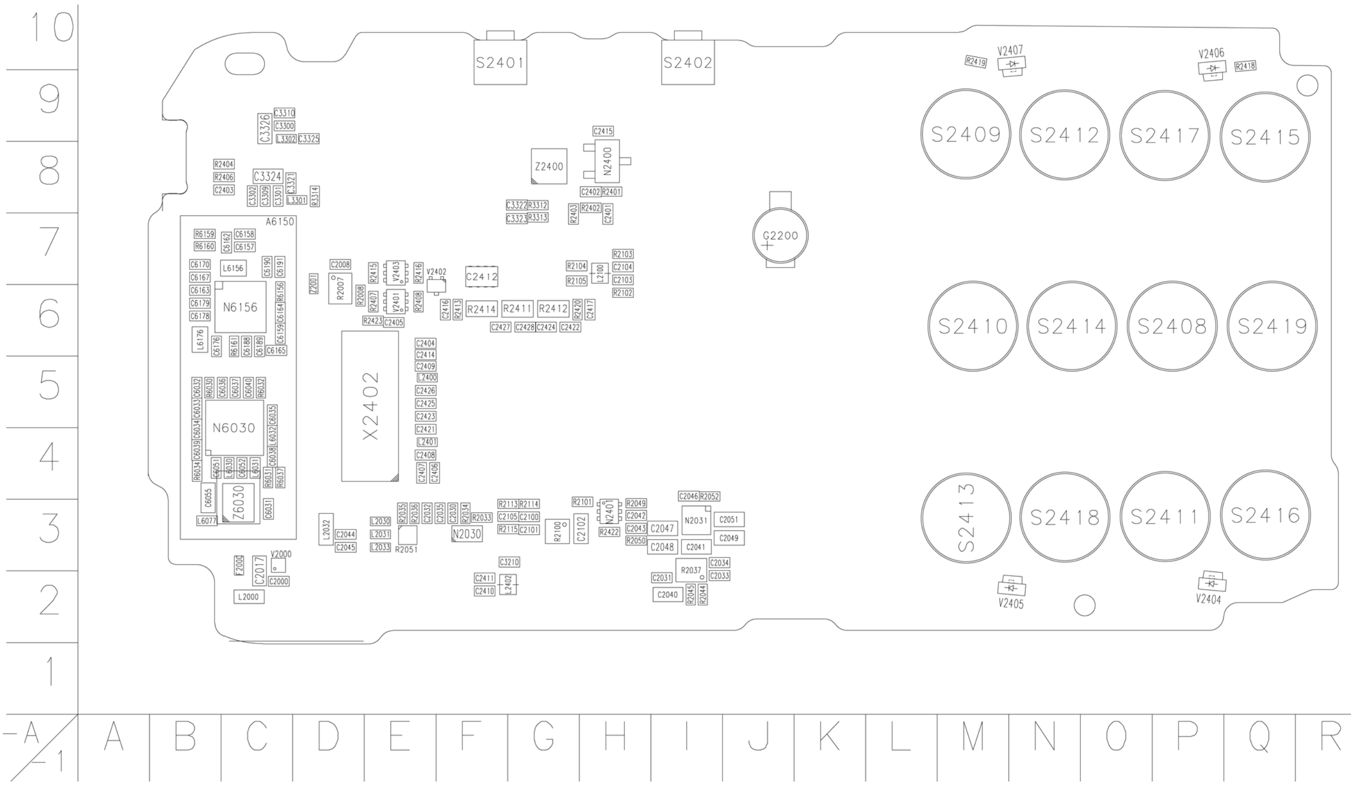

N2600
R2600
C2600
S2404
Z2102
E2101
G7501
G7500
N7505
Z7503
A7000
C2070
A2400
X2070
N7520
X7000
Z7001
R7000
C7001
C7000
D2800
D3000
A2800
D2200
B2200
C2200
C2231
L2302
N2300
C2309
C2301
L2301
C2306
C2307
C2312
C2313
C2303
C2227
C2210
C2211
C2222
C2221
C2314
L2304
C2315
N2301
R2303
R2700
L2701
X2700
N3200
R3200
R2417
X3300
S2403
M2100
X2002
X2000
E2001
E2002
X3200
X2030
10
9
8
7
6
5
4
3
2
1
R
Q
P
O
N
M
L
K
J
I
H
G
F
E
D
C
B
A

Figure 5 Main board layout, bottom side (1tta_41a)


S2401
S2402
S2409
S2412
S2417
S2415
S2410
S2414
S2408
S2419
S2413
S2418
S2411
S2416
G2200
Z2400
N2400
A6150
N6156
N6030
Z6030
X2402
N2030
N2031
C2412
R2414
R2411
R2412
C3324
V2407
V2406
V2405
V2404
V2402
V2403
V2401
V2400
V2000
C2017
C2102
C2047
C2048
L2000
10
9
8
7
6
5
4
3
2
1
-A
-1
A
B
C
D
E
F
G
H
I
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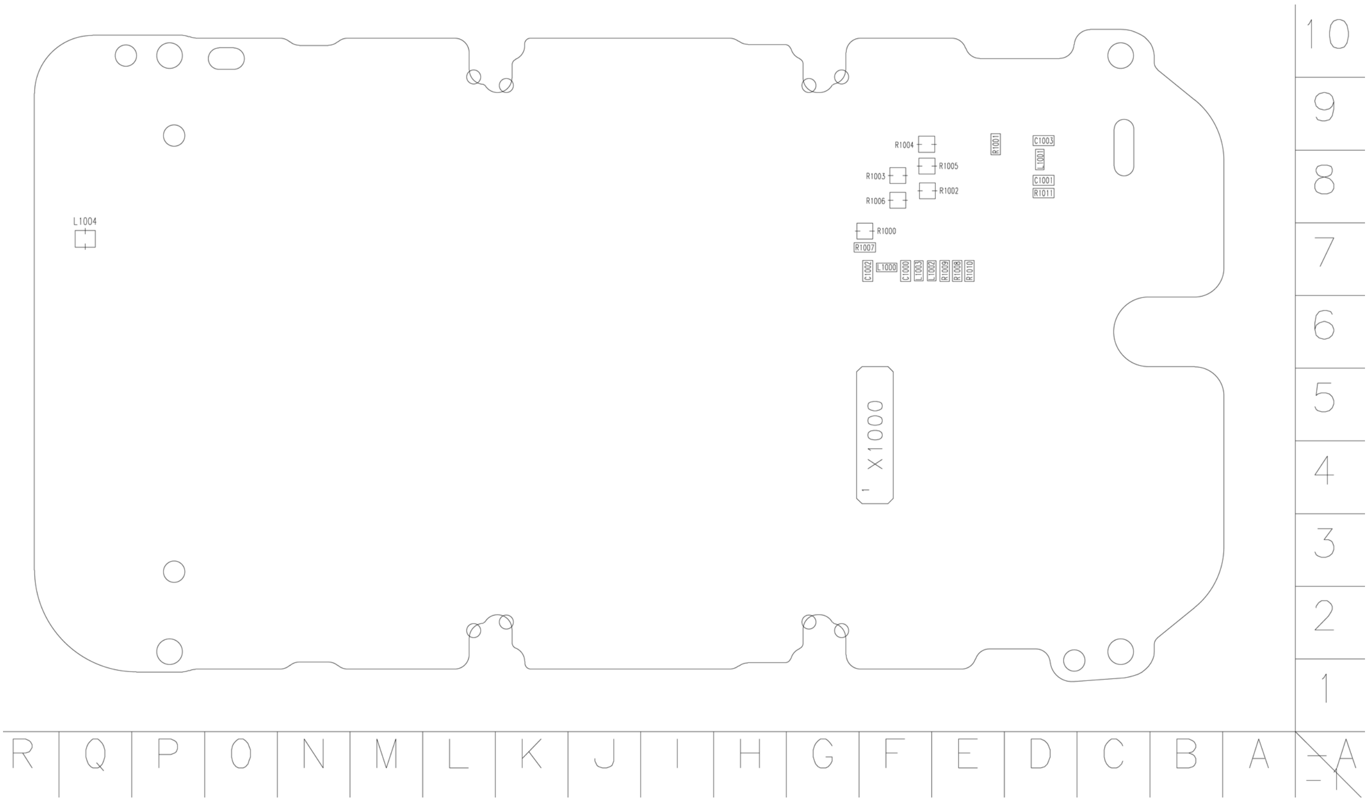
Q
R

Figure 6 Main board layout, top side (1tta_41a)


L1004
R1004
R1003
R1006
R1005
R1002
R1000
R1007
R1001
C1003
L1001
C1001
R1011
C1002
L1000
C1000
L1003
L1002
R1009
R1008
R1010
X1000
10
9
8
7
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R
Q
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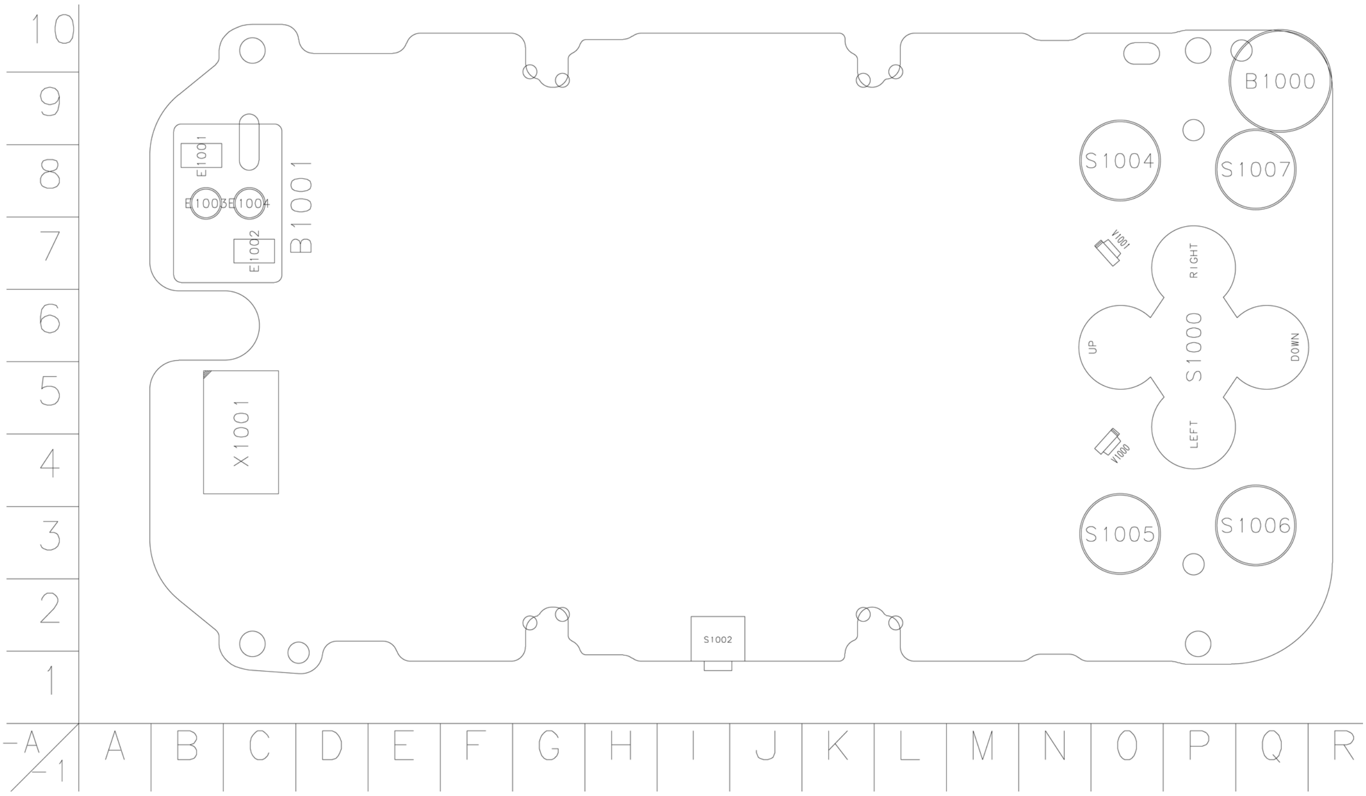
A
-A
-1

Figure 7 Top board layout, bottom side (1tua_41a)


10
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4
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1
-A
-1
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
B1000
S1004
S1007
E1001
E1003
E1004
E1002
B1001
V1001
RIGHT
UP
S1000
DOWN
LEFT
V1000
X1001
S1005
S1006
S1002

Figure 8 Top board layout, top side (1tua_41a)

3 — Service Software Instructions

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Phoenix installation steps in brief

Prerequisites

Recommended hardware requirements:

- Computer processor: Pentium 700 MHz or higher
- RAM 256 MB
- Disk space 100-300 MB

Supported operating systems:

- *Windows 2000* Service Pack 3 or higher
- *Windows XP* Service Pack 1 or higher

Context

Phoenix is a service software for reprogramming, testing and tuning phones.

Phoenix installation contains:

- Service software support for all phone models included in the package
- Flash update package files for programming devices
- All needed drivers for:
  - PKD-1 (DK2) dongle
  - DKU-2 USB cable

Note: Separate installation packages for flash update files and drivers are also available, but it is not necessary to use them unless there are updates between *Phoenix* service software releases. If separate update packages are used, they should be used after *Phoenix* and data packages have been installed.

The phone model specific data package includes all changing product specific data:

- Product software binary files
- Files for type label printing
- Validation file for the faultlog repair data reporting system
- All product specific configuration files for *Phoenix* software components

Note: *Phoenix* and phone data packages should only be used as complete installation packages. Uninstallation should be made from the *Windows* Control Panel.

To use *Phoenix*, you need to:

Steps

1. Connect a PKD-1 (DK2) dongle to the computer parallel port.
2. Install *Phoenix*.
3. Install the phone-specific data package.
4. Configure users.
5. Manage connection settings (depends on the tools you are using).

If you use FPS-8:	• Update FPS-8 software • Activate FPS-8

If you use FPS-10:	• Update FPS-10 software **Note:** There is no need to activate FPS-10. • Activate SX-4 smart card, if you need tuning and testing functions. **Note:** When FPS-10 is used only for product software updates, SX-4 smart card is not needed.

Results

Phoenix is ready to be used with FPS-8 or FPS-10 flash prommers and other service tools.

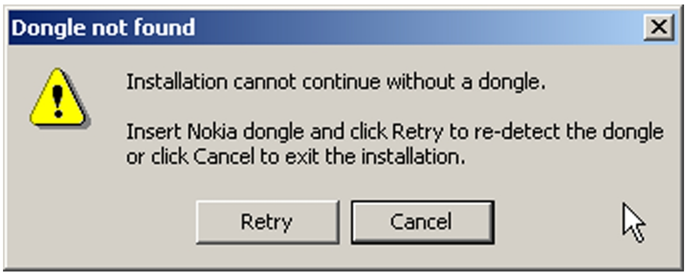
Installing *Phoenix*

Prerequisites

- Check that a dongle is attached to the parallel port of your computer.
- Download the *Phoenix* installation package (for example, *phoenix_service_sw_2004_39_x_xx.exe*) to your computer (in *C:|TEMP*, for instance).
- Close all other programs.
- Depending on your operating system, administrator rights may be required to install *Phoenix*.
- If uninstalling or rebooting is needed at any point, you will be prompted by the InstallShield program.

Context

At some point during the installation procedure, you may get the following message:



Dongle not found

Installation cannot continue without a dongle.

Insert Nokia dongle and click Retry to re-detect the dongle or click Cancel to exit the installation.

Figure 9 Dongle not found

This may be a result of a defective or too old PKD-1 dongle.

Check the COM/parallel ports used. After correcting the problem, you can restart the installation.

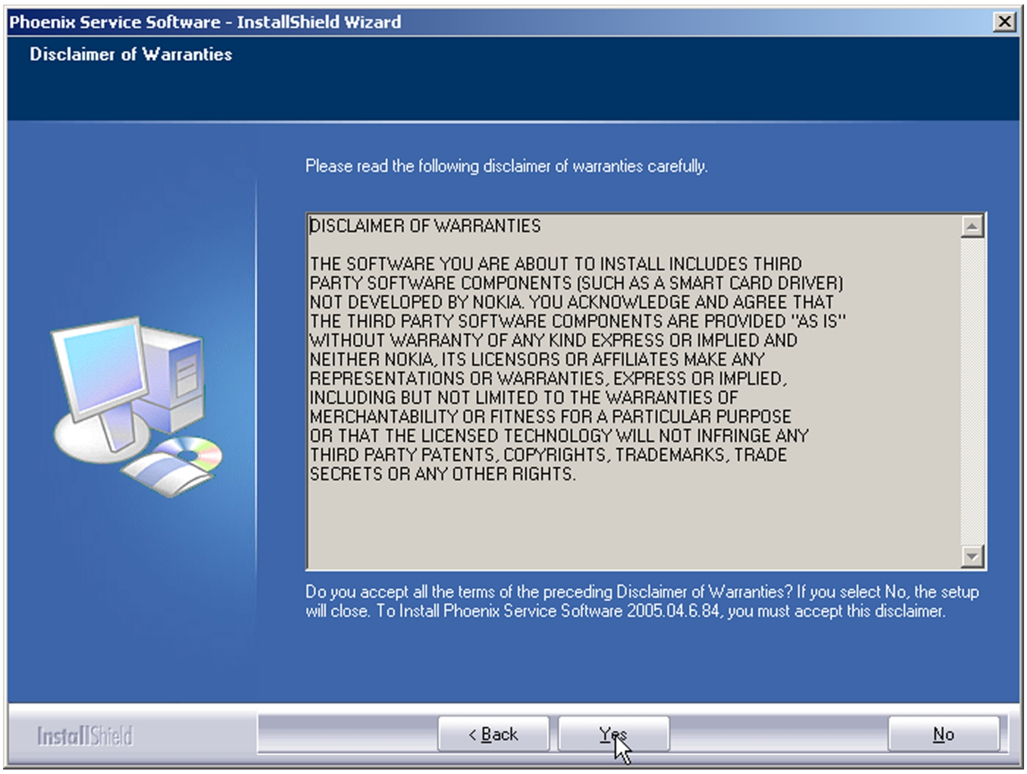
For more detailed information, please refer to *Phoenix* Help files.

> **Tip:** Each feature in *Phoenix* has its own Help function, which can be activated while running the program. Press the **F1** key or the feature's **Help** button to activate a Help file.

Steps

1. To start the installation, run the application file (for example,*phoenix_service_sw_2004_39_x_xx.exe*).
2. In the *Welcome* dialogue, click **Next**.

3. Read the disclaimer text carefully and click **Yes**.



Please read the following disclaimer of warranties carefully.

DISCLAIMER OF WARRANTIES

THE SOFTWARE YOU ARE ABOUT TO INSTALL INCLUDES THIRD PARTY SOFTWARE COMPONENTS (SUCH AS A SMART CARD DRIVER) NOT DEVELOPED BY NOKIA. YOU ACKNOWLEDGE AND AGREE THAT THE THIRD PARTY SOFTWARE COMPONENTS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND EXPRESS OR IMPLIED AND NEITHER NOKIA, ITS LICENSORS OR AFFILIATES MAKE ANY REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR THAT THE LICENSED TECHNOLOGY WILL NOT INFRINGE ANY THIRD PARTY PATENTS, COPYRIGHTS, TRADEMARKS, TRADE SECRETS OR ANY OTHER RIGHTS.

Do you accept all the terms of the preceding Disclaimer of Warranties? If you select No, the setup will close. To Install Phoenix Service Software 2005.04.6.84, you must accept this disclaimer.

Figure 10 Disclaimer text

4. Choose the destination folder.

   The default folder *C:|ProgramFiles|Nokia|Phoenix* is recommended.
5. To continue, click **Next.**

   To choose another location, click **Browse** (not recommended).
6. Wait for the components to be copied.

   The progress of the installation is shown in the *Setup Status* window.
7. Wait for the drivers to be installed and updated.

   The process may take several minutes to complete.

   If the operating system does not require rebooting, the PC components are registered right away.

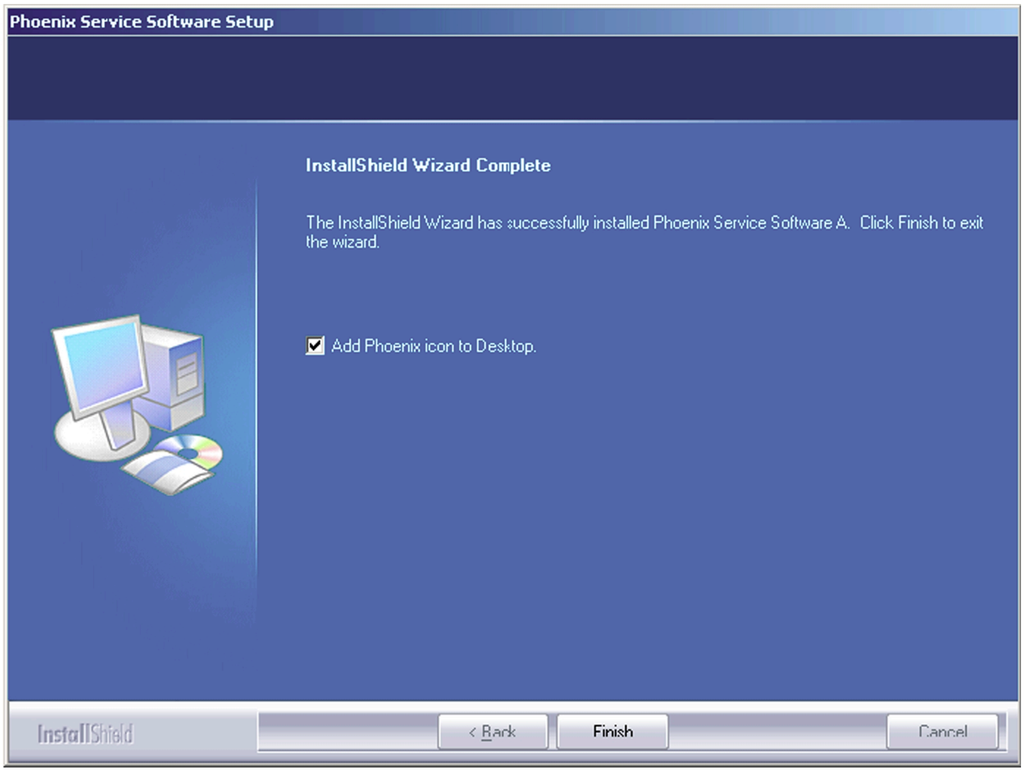
   If the operating system requires restarting your computer, the Install Shield Wizard will notifies about it.

   Select **Yes...** to reboot the PC immediately or **No...** to reboot the PC manually afterwards.

   After the reboot, all components are registered.

   Note: *Phoenix* does not work, if the components have not been registered.

8. To end the installation, click **Finish**.



InstallShield Wizard Complete

The InstallShield Wizard has successfully installed Phoenix Service Software A. Click Finish to exit the wizard.

☑ Add Phoenix icon to Desktop.

Figure 11 InstallShield Wizard Complete

Next actions

After the installation, *Phoenix* can be used after:

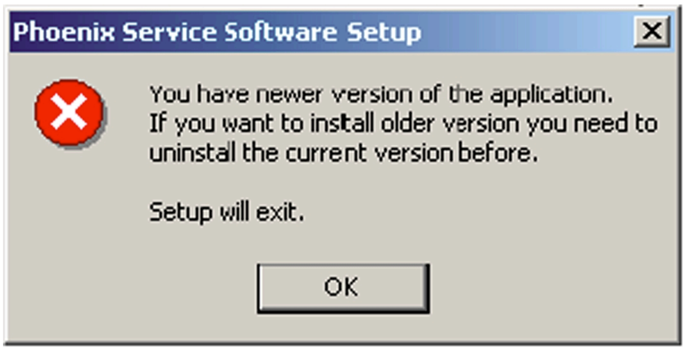
- installing phone model specific data package for *Phoenix*
- configuring users and connections

FPS-8 and FPS-10 flash prommers can be used after updating their flash update package files.

Updating *Phoenix* installation

Context

- If you already have the *Phoenix* service software installed on your computer, you need to update the software when new versions are released.
- To update *Phoenix*, you need to follow the same steps as when installing it for the first time.
- When you are updating, for example, from version **a14_2004_16_4_47** to **a15_2004_24_7_55**, the update will take place automatically without uninstallation.
- Always use the latest available versions of both *Phoenix* and the phone-specific data package. Instructions can be found in the phone model specific Technical Bulletins and phone data package *readme.txt* files (shown during installation).
- If you try to update *Phoenix* with the same version you already have (for example, **a15_2004_24_7_55** to **a15_2004_24_7_55**), you are asked if you want to uninstall the existing version. In this case you can choose between a total uninstallation or a repair installation in a similar way when choosing to uninstall the application from the *Windows* Control Panel.
- If you try to install an older version (for example, downgrade from **a15_2004_24_7_55** to **a14_2004_16_4_47**), installation will be interrupted.



You have newer version of the application.
If you want to install older version you need to uninstall the current version before.

Setup will exit.

Figure 12 Installation interrupted

- Always follow the instructions on the screen.

Steps

1. Download the installation package to your computer hard disk.
2. Close all other programs.
3. Run the application file (for example, *phoenix_service_sw_2004_39_x_xx.exe*).

Results

A new *Phoenix* version is installed and driver versions are checked and updated.

Uninstalling *Phoenix*

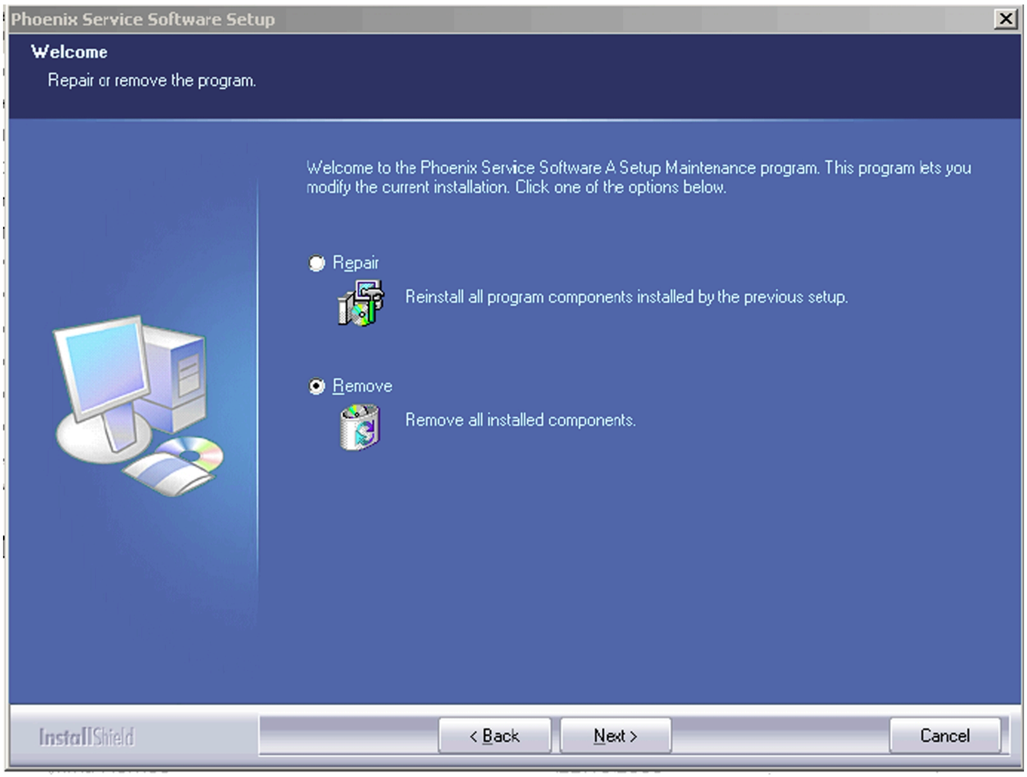
Context

You can uninstall *Phoenix* service software manually from the *Windows* Control Panel.

Steps

1. Open the **Windows Control Panel**, and choose **Add/Remove Programs**.

2. To uninstall *Phoenix*, choose **Phoenix Service Software→Change/Remove→Remove** .


Phoenix Service Software Setup
InstallShield
< Back
Next >
Cancel

Welcome

Repair or remove the program.

Welcome to the Phoenix Service Software A Setup Maintenance program. This program lets you modify the current installation. Click one of the options below.

○ Repair

Reinstall all program components installed by the previous setup.

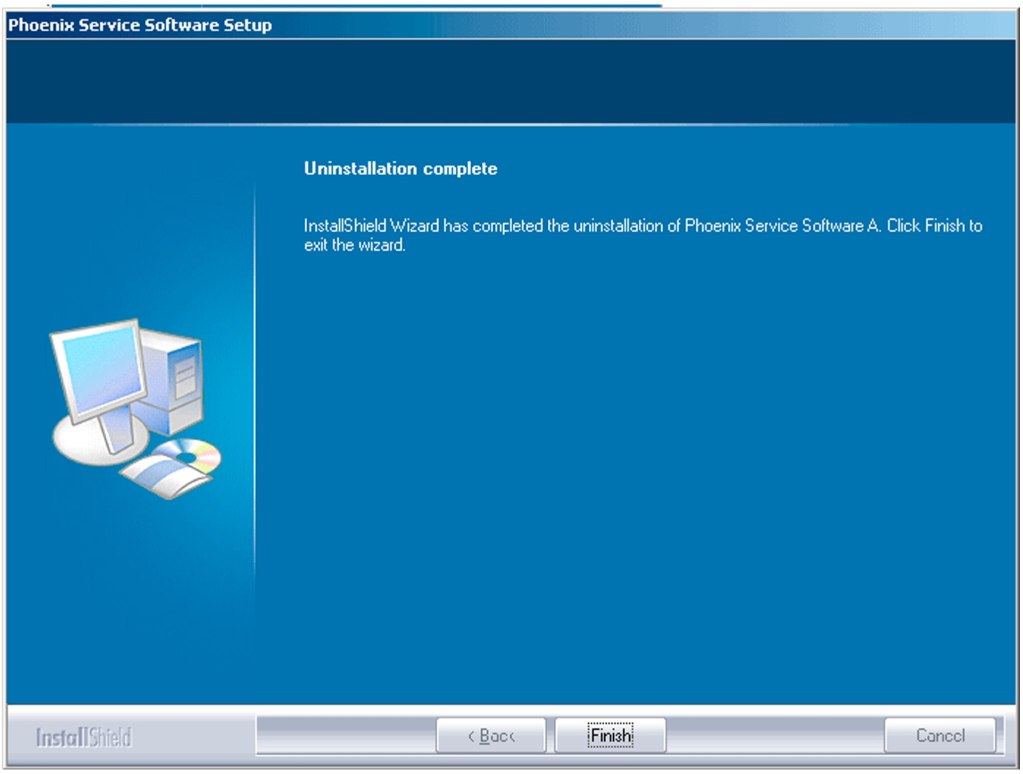
● Remove

Remove all installed components.

Figure 13 Remove program

The progress of the uninstallation is shown.

3. If the operating system does not require rebooting, click **Finish** to complete.


Phoenix Service Software Setup
InstallShield
< Back
Finish
Cancel

Uninstallation complete

InstallShield Wizard has completed the uninstallation of Phoenix Service Software A. Click Finish to exit the wizard.

Figure 14 Finish uninstallation

If the operating system requires rebooting, InstallShield Wizard will notify you. Select **Yes...** to reboot the PC immediately and **No...** to reboot the PC manually afterwards.

Repairing *Phoenix* installation

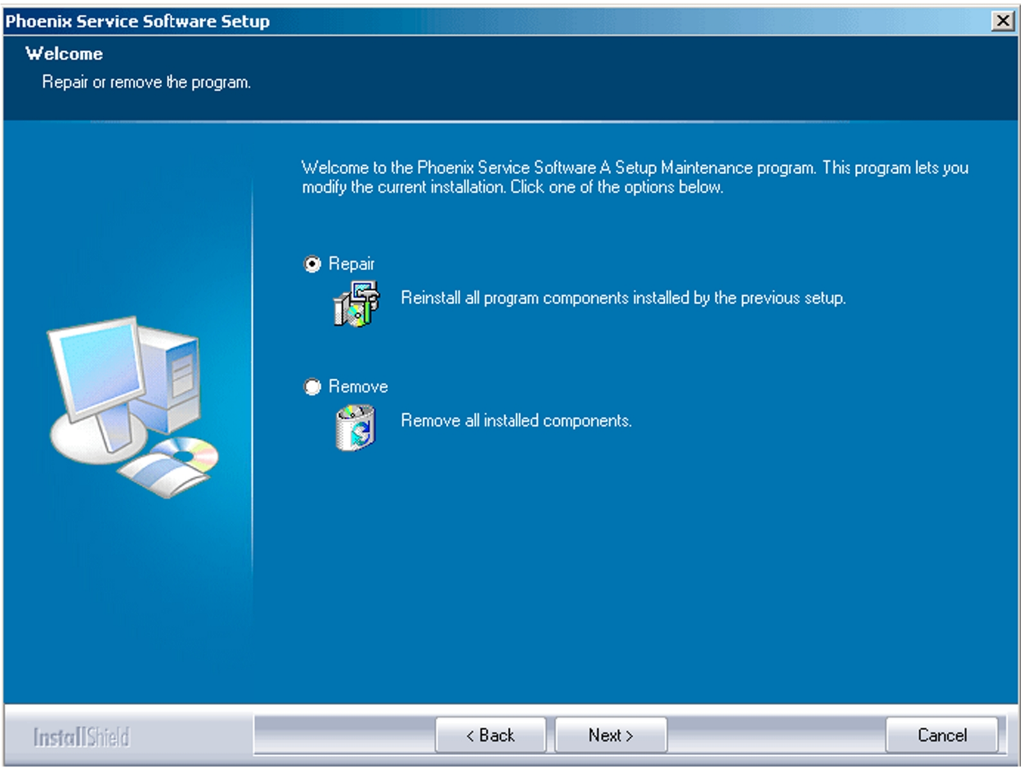
Context

If you experience any problems with the service software or suspect that files have been lost, use the repair function before completely reinstalling *Phoenix*.

> **Note:** The original installation package (for example, *phoenix_service_sw_a15_2004_24_7_55.exe*) must be found on your PC when you run the repair setup.

Steps

1. Open **Windows Control Panel→Add/Remove Programs** .
2. Choose **Phoenix Service Software→Change/Remove** .
3. In the following view, select **Repair**.



Welcome to the Phoenix Service Software A Setup Maintenance program. This program lets you modify the current installation. Click one of the options below.

● Repair
Reinstall all program components installed by the previous setup.

○ Remove
Remove all installed components.

Figure 15 Repair program

Phoenix reinstalls components and registers them.

The procedure is the same as when updating *Phoenix*.

4. To complete the repair, click **Finish**.

Phone data package overview

Each product has its own data package (DP). The product data package contains all product-specific data files to make the Phoenix service software and tools usable with a certain phone model.

The phone data package contains the following:

- Product software binary files

- Files for type label printing
- Validation file for the fault log repair data reporting system
- All product-specific configuration files for Phoenix software components

Data files are stored in **C:\Program Files\Nokia\Phoenix** (default).

Installing phone data package

Prerequisites

- A phone-specific data package contains all data required for the *Phoenix* service software and service tools to be used with a certain phone model.
- Check that a dongle is attached to the parallel port of your computer.
- Install *Phoenix* service software.
- Download the installation package (for example, *XX-XX_dp_EA_v_1_0.exe*) to your computer (for example, in C:\TEMP).
- Close all other programs.

(XX-XX = type designator of the product)

If you already have *Phoenix* installed on your computer, you will need to update it when a new version is released.

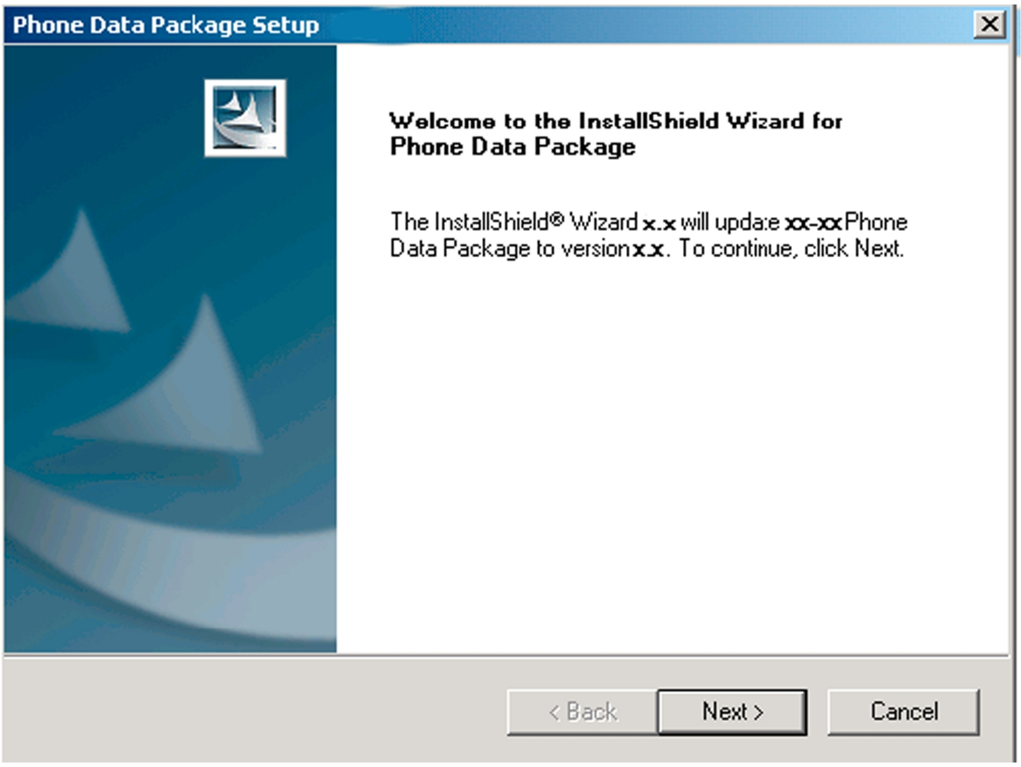
> **Note:** Often *Phoenix* and the phone-specific data package come in pairs, meaning that a certain version of *Phoenix* can only be used with a certain version of a data package. Always use the latest available versions of both. Instructions can be found in phone-specific Technical Bulletins and *readme.txt* files of data packages.

Steps

1. To start the installation, run the application file (for example, *XX-XX_dp_EA_ v_1_0.exe*),

   Wait for the installation files to be extracted.

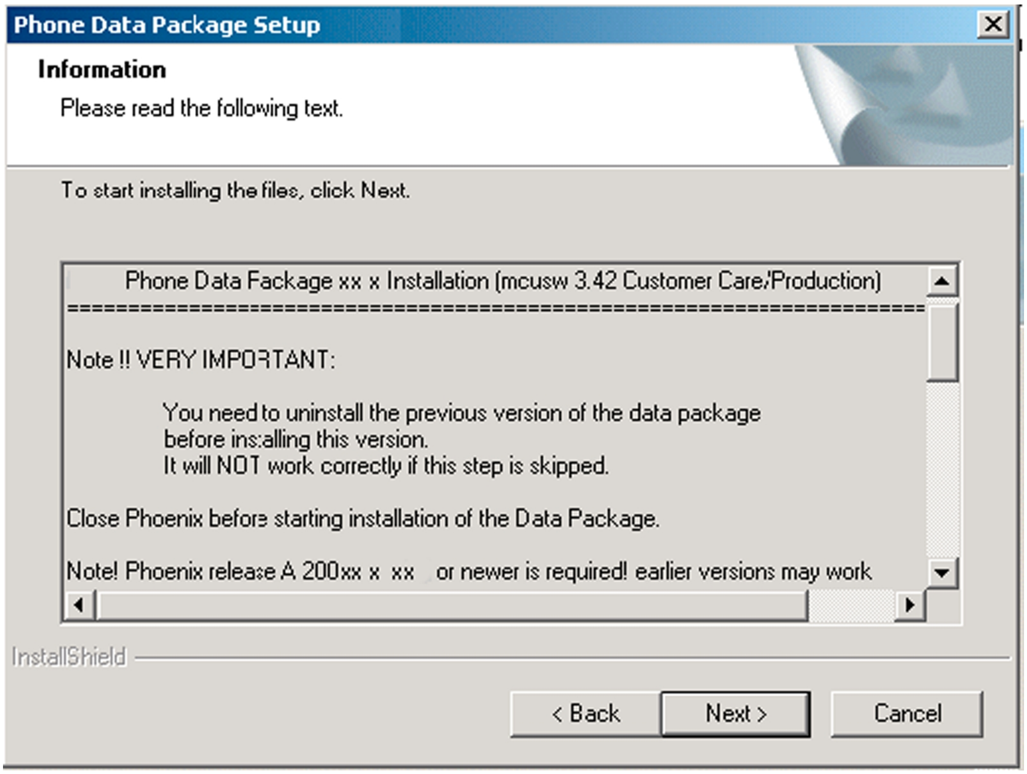
2. Click **Next**.



Welcome to the InstallShield Wizard for Phone Data Package

The InstallShield® Wizard x.x will update xx-xx Phone Data Package to version x.x. To continue, click Next.

3. In the following view you can see the contents of the data package. Read the text carefully. There is information about the *Phoenix* version required with this data package.



Information

Please read the following text.

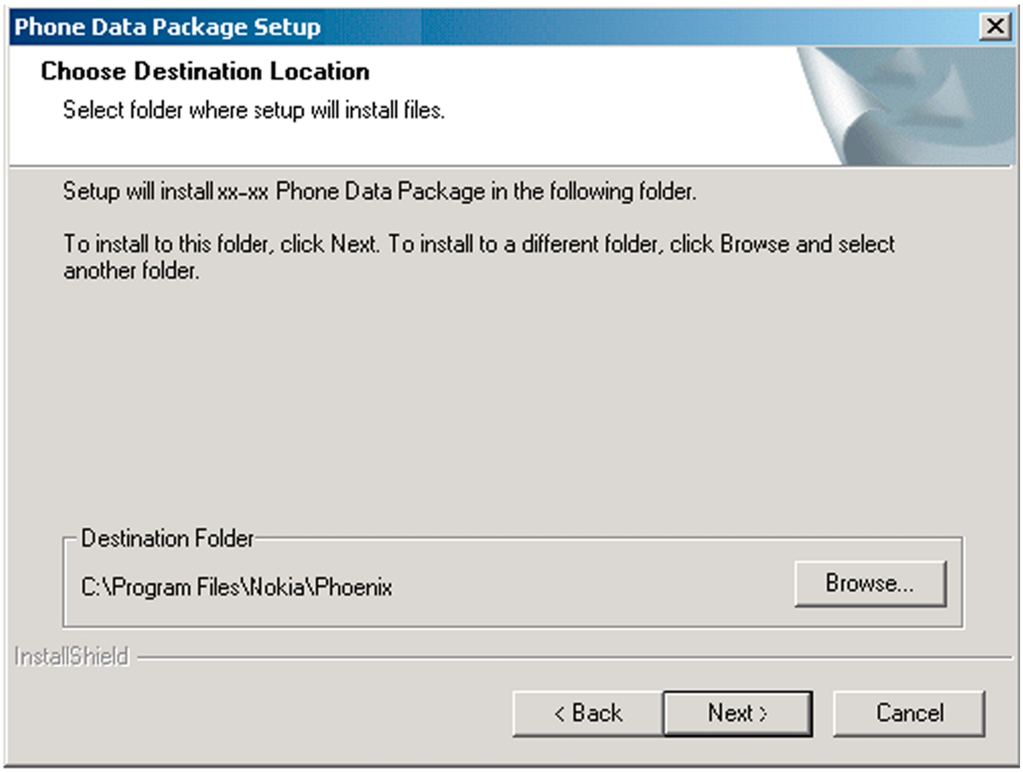
To start installing the files, click Next.

```
     Phone Data Package xx x Installation (mcusw 3.42 Customer Care/Production)
==========================================================================

Note !! VERY IMPORTANT:

          You need to uninstall the previous version of the data package
          before installing this version.
          It will NOT work correctly if this step is skipped.

Close Phoenix before starting installation of the Data Package.

Note! Phoenix release A 200xx x  xx   or newer is required! earlier versions may work
```

Figure 16 Data package setup information

4. To continue, click **Next**.

5. Choose the destination folder, and click **Next** to continue.



Phone Data Package Setup

Choose Destination Location

Select folder where setup will install files.

Setup will install xx-xx Phone Data Package in the following folder.

To install to this folder, click Next. To install to a different folder, click Browse and select another folder.

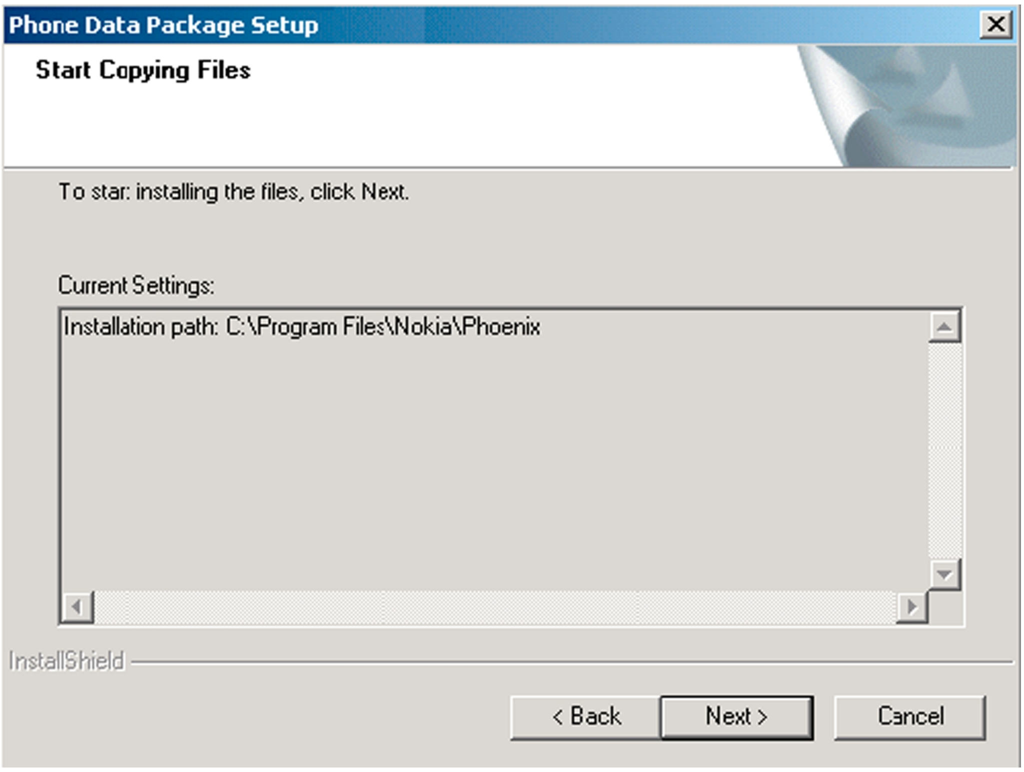
Destination Folder

C:\Program Files\Nokia\Phoenix

Figure 17 Data package destination folder

The InstallShield Wizard checks where *Phoenix* is installed, and the directory is shown.

6. To start copying the files, click **Next**.



Phone Data Package Setup

Start Copying Files

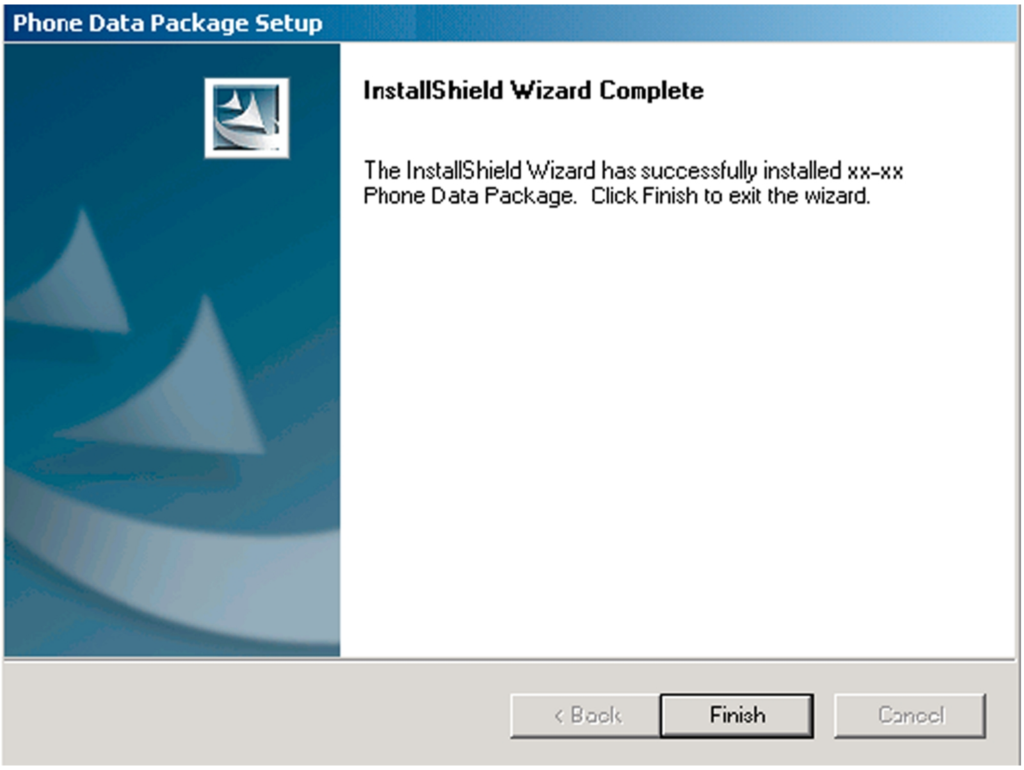
To start installing the files, click Next.

Current Settings:

Installation path: C:\Program Files\Nokia\Phoenix

Phone model specific files are installed. Please wait.

7. To complete the installation, click **Finish**.



InstallShield Wizard Complete

The InstallShield Wizard has successfully installed xx-xx Phone Data Package. Click Finish to exit the wizard.

Figure 18 InstallShield Wizard Complete

Next actions

Phoenix can be used for flashing phones and printing type labels after:

- Configuring users
- Managing connections

FPS-8 and FPS-10 can be used after updating their flash update package files.

Uninstalling phone data package

Context

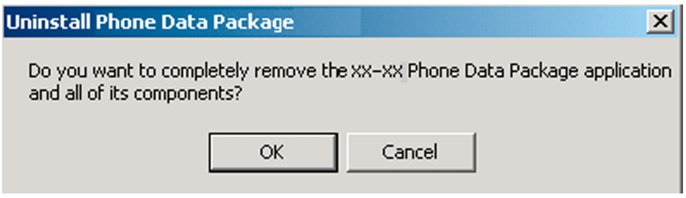
There is no need to uninstall an older version of a data package, unless instructions to do so are given in the *readme.txt* file of the data package and bulletins related to the release.

Please read all related documents carefully.

Steps

1. Locate the data package installation file (e.g. *XX-XX_dp_EA_v_1_0.exe*) from your computer.
2. To start the uninstallation procedure, double-click the data package installation file.

3. To uninstall the data package, click **OK** or to interrupt the uninstallation, click **Cancel**.

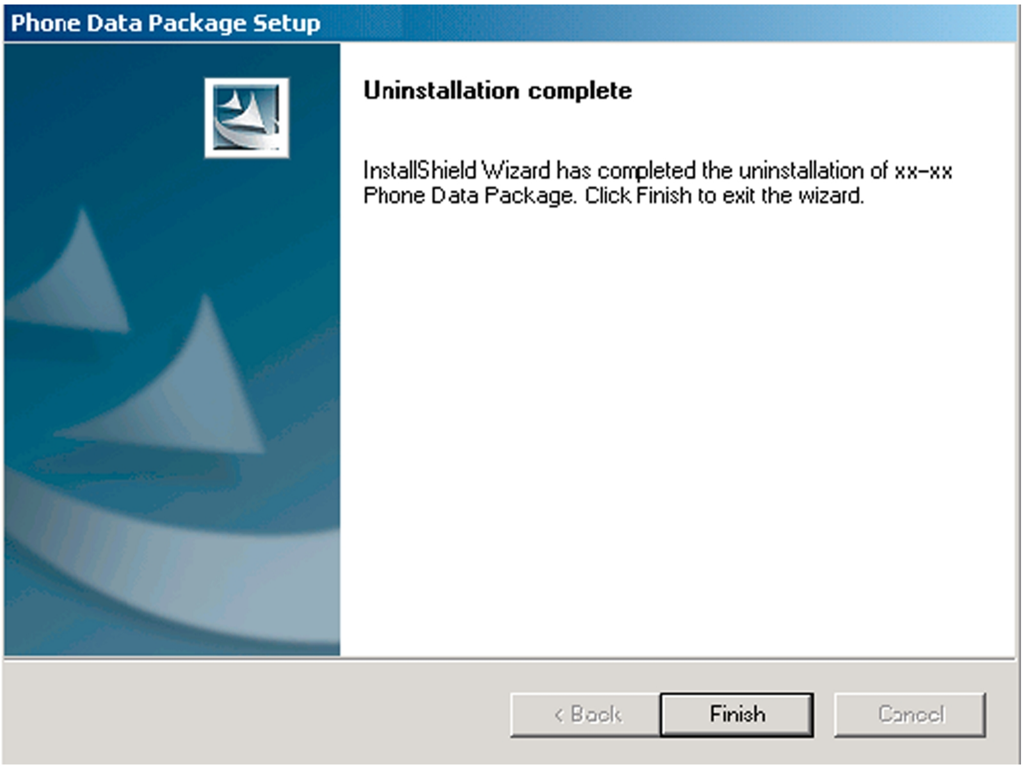


Uninstall Phone Data Package

Do you want to completely remove the xx-xx Phone Data Package application and all of its components?

Figure 19 Uninstalling phone data package

4. When the data package is uninstalled, click **Finish**.



Phone Data Package Setup

Uninstallation complete

InstallShield Wizard has completed the uninstallation of xx-xx Phone Data Package. Click Finish to exit the wizard.

Figure 20 Finishing data package uninstallation

Alternative steps

- You can also uninstall the data package manually from **Control Panel→Add/Remove Programs→xx-xx* Phone Data Package** . (*= type designator of the phone).

Configuring users in *Phoenix*

Steps

1. Start *Phoenix* service software, and log in.

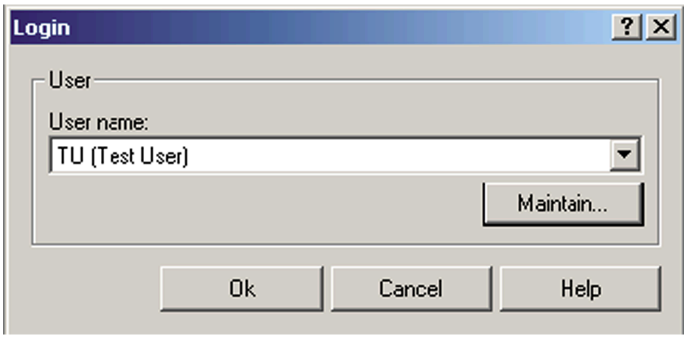


Figure 21 Phoenix login

If the user ID is already configured, select s/he from the *User name* drop-down list, and click **OK**.

2. To add a new user, or to edit existing ones, click **Maintain**.
3. To add a new user, click **New**.
4. Type in the name and initials of the user, and click **OK**.

   The user is added to the user name list.
5. Select the desired user from the *User name* drop-down list, and click **OK**.

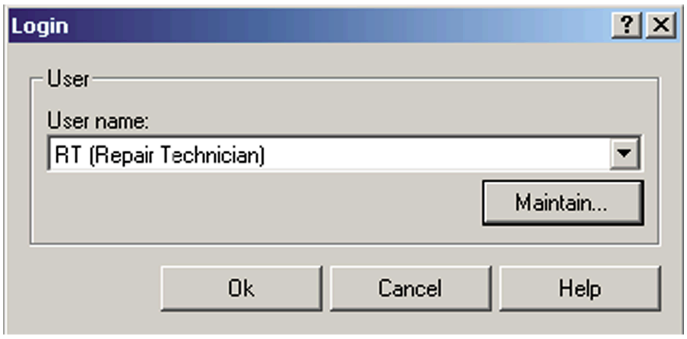


Figure 22 New user configured

Managing connections in *Phoenix*

Context

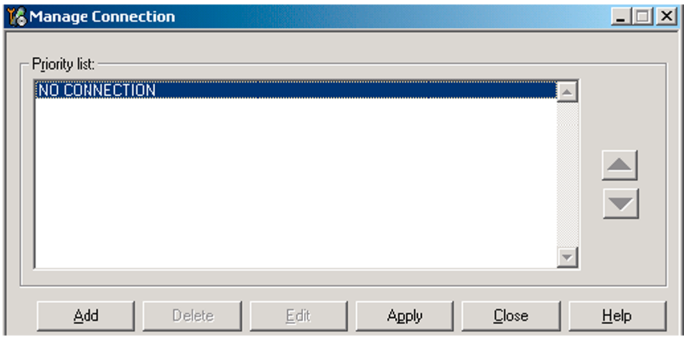
With the **Manage Connections** feature you can edit and delete existing connections or create new ones.

> **Note:** After choosing the desired connection, and connecting the phone to a PC for the first time, allow the PC to install the USB device drivers first. Please note that this may take some time to complete.
>
> If there are problems after the driver installation, check that the USB connection is active from the **Windows Control Panel**. If the problem persists, contact the local PC support.

Steps

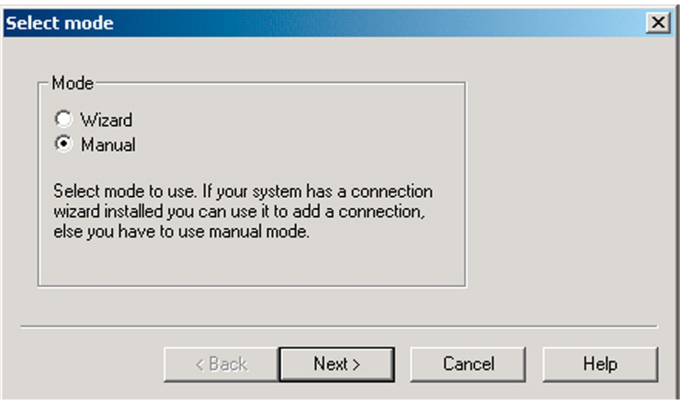
1. Start *Phoenix*, and log in.
2. Choose **File→Manage Connections...** .

3. To add a new connection, click **Add**.



4. Select **Manual** mode, and click **Next** to continue.

   If you want to create the connection using the Connection Wizard, connect the tools and a phone to your PC. The wizard will automatically try to configure the correct connection.



○ Wizard
● Manual

Select mode to use. If your system has a connection wizard installed you can use it to add a connection, else you have to use manual mode.

Figure 23 Select mode: Manual

i For an FPS-10 flash prommer with a **USB Connection**, choose the following connection settings:

- Media: **FPS-10 USB**
- DEVICE_INDEX: **0**
- SERIAL_NUM: See Serial No from the label attached to the bottom of FPS-10
- ACTIVE_MEDIA: **USB**

ii For an FPS-10 flash prommer with a **LAN connection**, choose the following connection settings:

- Media: **FPS-10 TCP/IP**
- NET_SERV_NAME: Click **Scan...**. Choose your own FPS-10 device based on the correct MAC address. See Serial No from the label attached to the bottom of your FPS-10.
- PORT_NUM: Use the default value, and click **Next**.
- PROTOCOL_FAMILY: Use the default value, and click **Next**.
- SOCKET TYPE: Use the default value, and click **Next**.
- TX_BUFFER_SIZE: Use the default value, and click **Next**.
- RX_BUFFER_SIZE: Use the default value, and click **Next**.

iii For an FPS-8 flash prommer, choose the following connection settings:

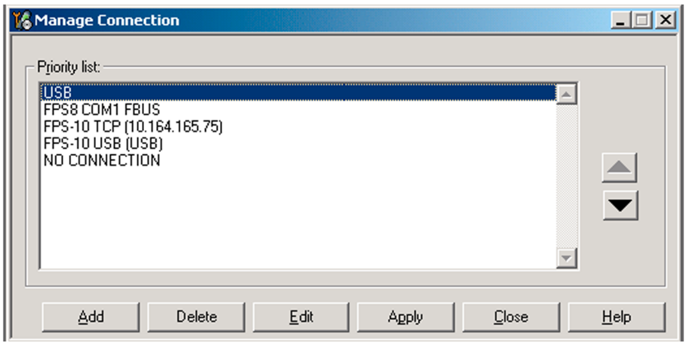
- Media: FPS-8
- PORT_NUM: COM Port where FPS-8 is connected
- COMBOX_DEF_MEDIA: **FBUS**

iv For a plain **USB connection**, choose the following connection settings:

Note: First connect the DKU-2 USB cable between the PC USB port and phone.

- Media: USB

5. To complete the configuration, click **Finish**.
6. Click the connection you want to activate. Use the up/down arrows located on the right hand side to move it on top of the list, then click **Apply**.



USB
FPS8 COM1 FBUS
FPS-10 TCP (10.164.165.75)
FPS-10 USB (USB)
NO CONNECTION

Figure 24 Connections list

The connection is activated, and it can be used after closing the *Manage Connection* window.

The connection information is shown at the right hand bottom corner of the screen.

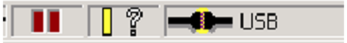
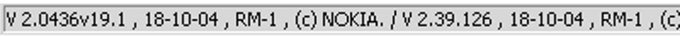


Figure 25 Connection information

7. To use the connection, connect the phone to your PC with correct service tools. Make sure the phone is switched on, and then choose **File→Scan Product** .

Results

The product support module information appears in the status bar:



V 2.0436v19.1 , 18-10-04 , RM-1 , (c) NOKIA. / V 2.39.126 , 18-10-04 , RM-1 , (c)

Figure 26 Product support module information (example from RM-1)

Installing flash support files for FPS-8 and FPS-10

Prerequisites

- Install *Phoenix* service software.
- Install phone model specific data package for *Phoenix*.
- If you want to update the flash support files, they are delivered in the same installation package with *Phoenix* or newer *Phoenix* packages beginning from December 2004.

  In case you want to update the MCU files, install the latest data package (see Technical Bulletins for information on the latest one).

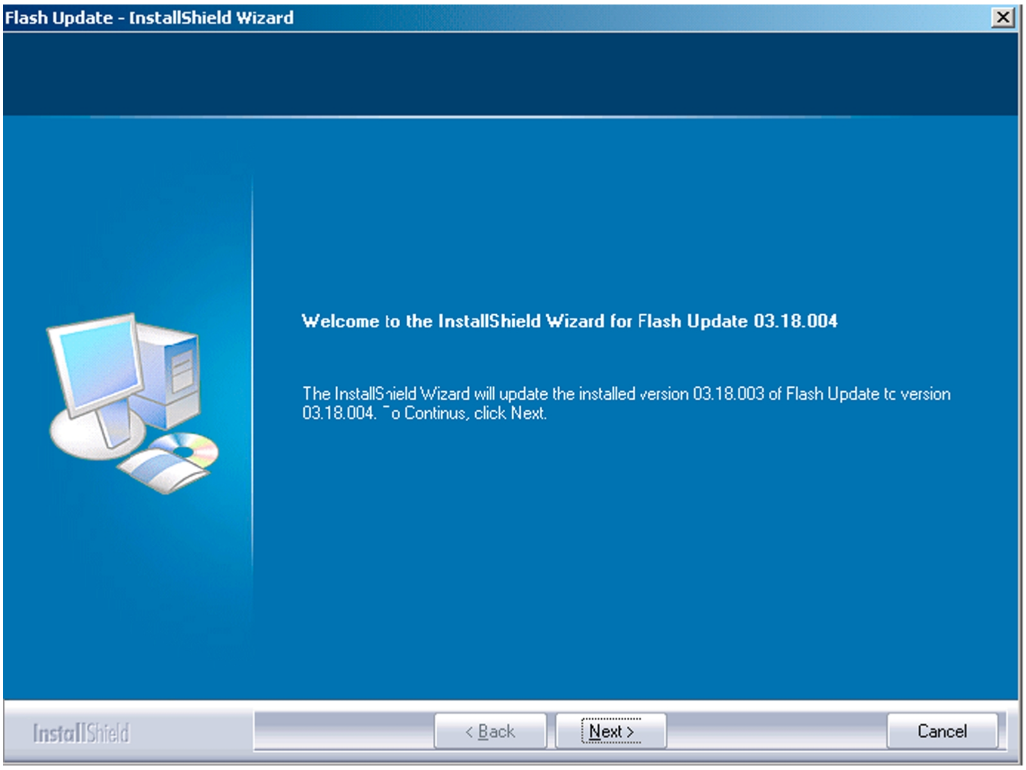
  Normally, it is enough to install *Phoenix* and the phone-specific data package because the installation always includes the latest flash update package files for FPS-8 and FPS-10.
- A separate installation package for flash support files is available. The files can be updated according to these instructions, if updates appear between *Phoenix* data package releases.

Context

If you are not using a separate installation package, you can skip this section and continue with "Updating FPS-8 and FPS-10 flash prommer software" (page 3–22) after installing a new phone data package.

Steps

1. To begin the installation, double-click the flash update file (for example, *flash_update_03_183_0014.exe*).



Flash Update - InstallShield Wizard

Welcome to the InstallShield Wizard for Flash Update 03.18.004

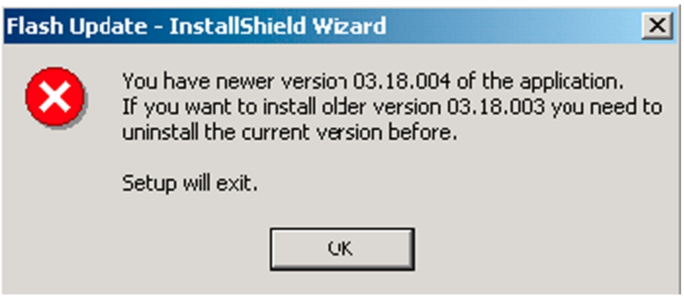
The InstallShield Wizard will update the installed version 03.18.003 of Flash Update to version 03.18.004. To Continue, click Next.

Figure 27 Flash update welcome dialog

   If the same version of the flash update package already exists, and you want to reinstall it, the previous package is first uninstalled.

   Restart installation again after the uninstallation.

2. If you try to downgrade the existing version to older ones, the setup will be aborted. If there is a need to downgrade the version, uninstall newer files manually from the **Windows Control Panel**, and then rerun the installation.



Flash Update - InstallShield Wizard

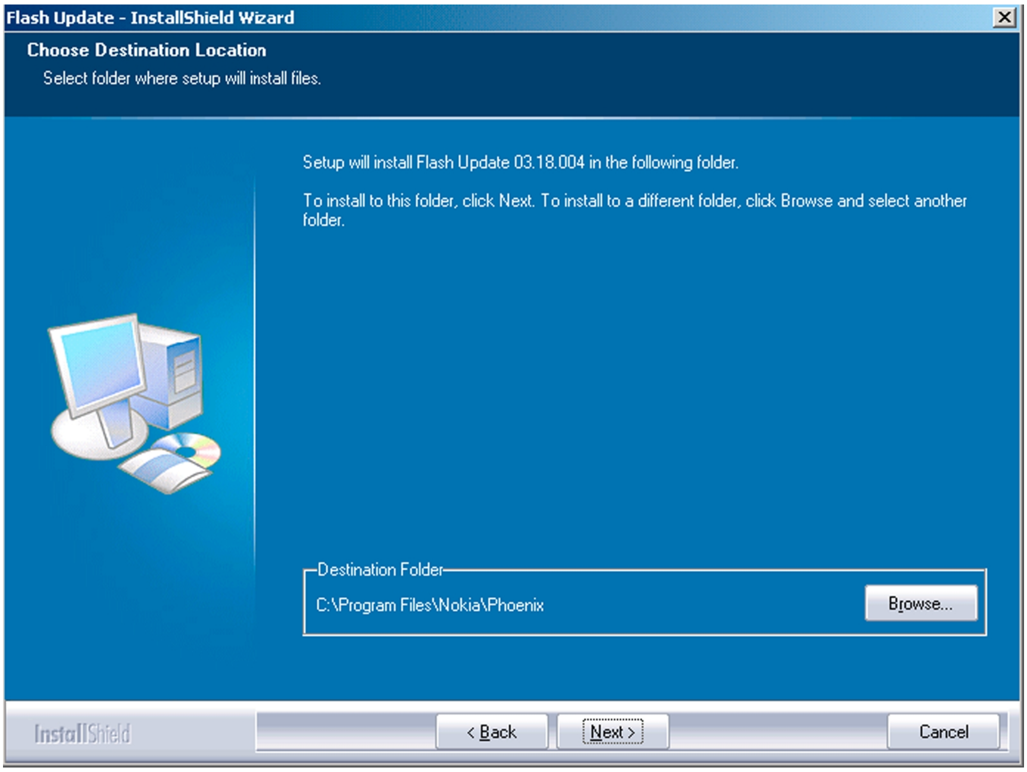
You have newer version 03.18.004 of the application.
If you want to install older version 03.18.003 you need to uninstall the current version before.

Setup will exit.

Figure 28 Flash installation interrupted

   If an older version exists on your PC and it needs to be updated, click **Next** to continue installation.

3. It is recommended to install the files to the default destination folder *C:|Program Files|Nokia|Phoenix*. To continue, click **Next**.



Flash Update - InstallShield Wizard

Choose Destination Location

Select folder where setup will install files.

Setup will install Flash Update 03.18.004 in the following folder.

To install to this folder, click Next. To install to a different folder, click Browse and select another folder.

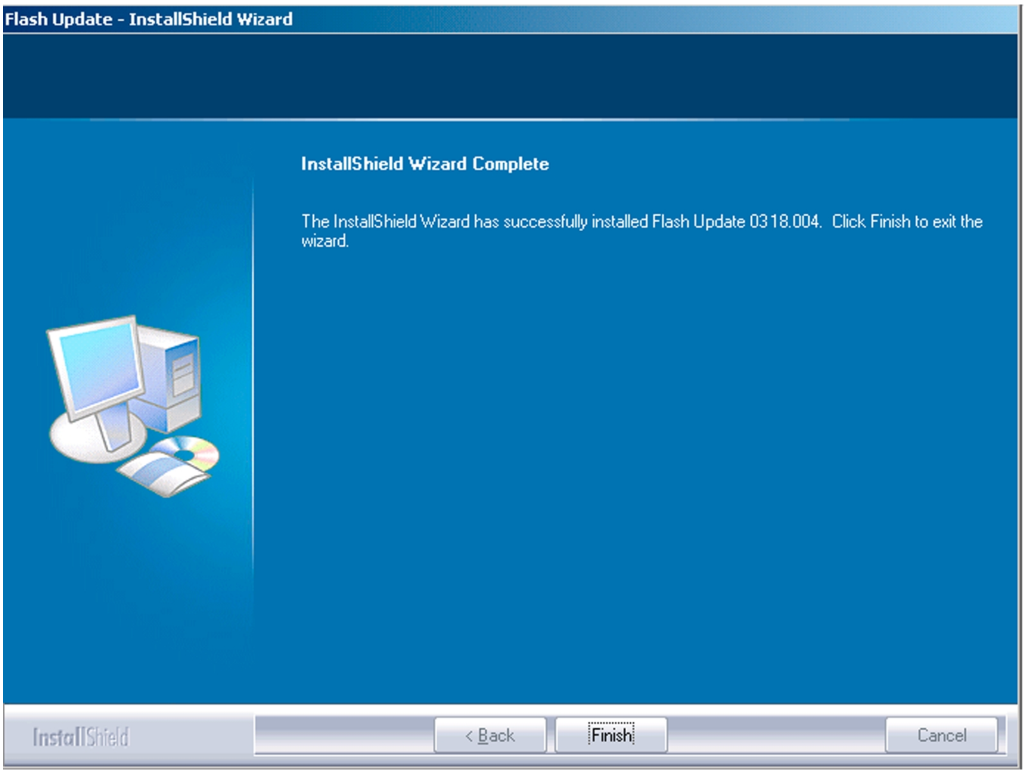
Destination Folder

C:\Program Files\Nokia\Phoenix

Figure 29 Flash destination folder

When installing the flash update files for the first time, you may choose another location by selecting **Browse** (not recommended).

4. To complete the installation procedure, click **Finish** .



Flash Update - InstallShield Wizard

InstallShield Wizard Complete

The InstallShield Wizard has successfully installed Flash Update 0318.004. Click Finish to exit the wizard.

InstallShield
< Back
Finish
Cancel

Figure 30 Finish flash update

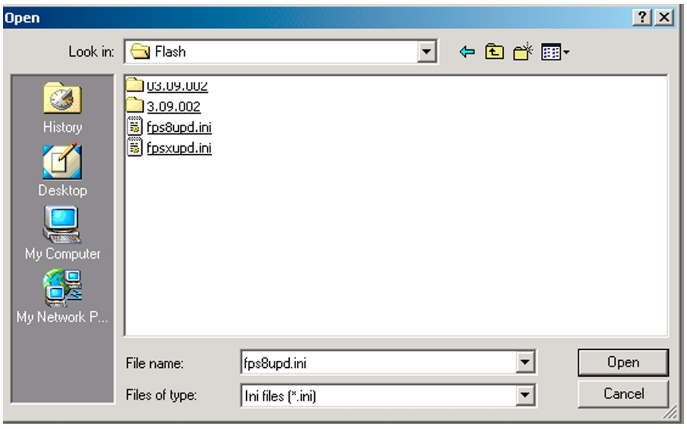
Next actions

FPS-8 and FPS-10 flash prommers must be updated using *Phoenix*.

Updating FPS-8 and FPS-10 flash prommer software

Steps

1. Start *Phoenix* service software, and log in.
2. Choose the correct connection for your flash prommer: **File→Manage Connections...**
3. Choose **Flashing→Prommer maintenance** .
4. To update the **FPS-8/FPS-10** software, click **Update**, and select the appropriate file *fps8upd.ini* (for FPS-8) or *fpsxupd.ini* (for FPS-10) from *C:|Program Files|Nokia|Phoenix|Flash*.



Open

Look in: Flash

File name: fps8upd.ini

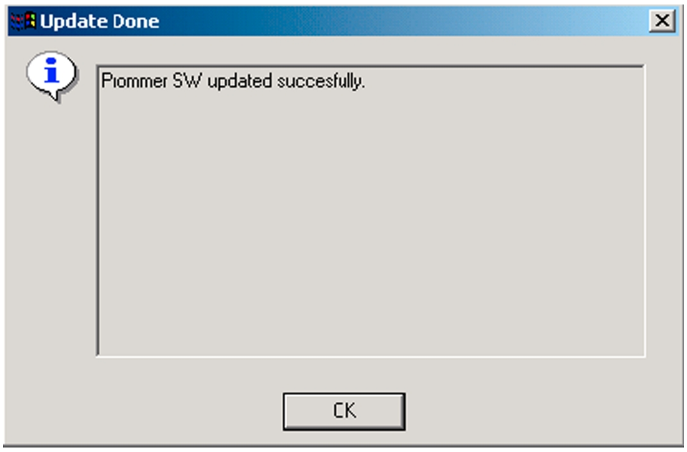
Files of type: Ini files (*.ini)

03.09.002
3.09.002
fps8upd.ini
fpsxupd.ini
History
Desktop
My Computer
My Network P...
Open
Cancel

Figure 31 Flash directory window

Tip: All files can be loaded separately to the prommer used. To do this, click the right mouse button in the *Flash Box Files* pane and select the file type(s) to be loaded.

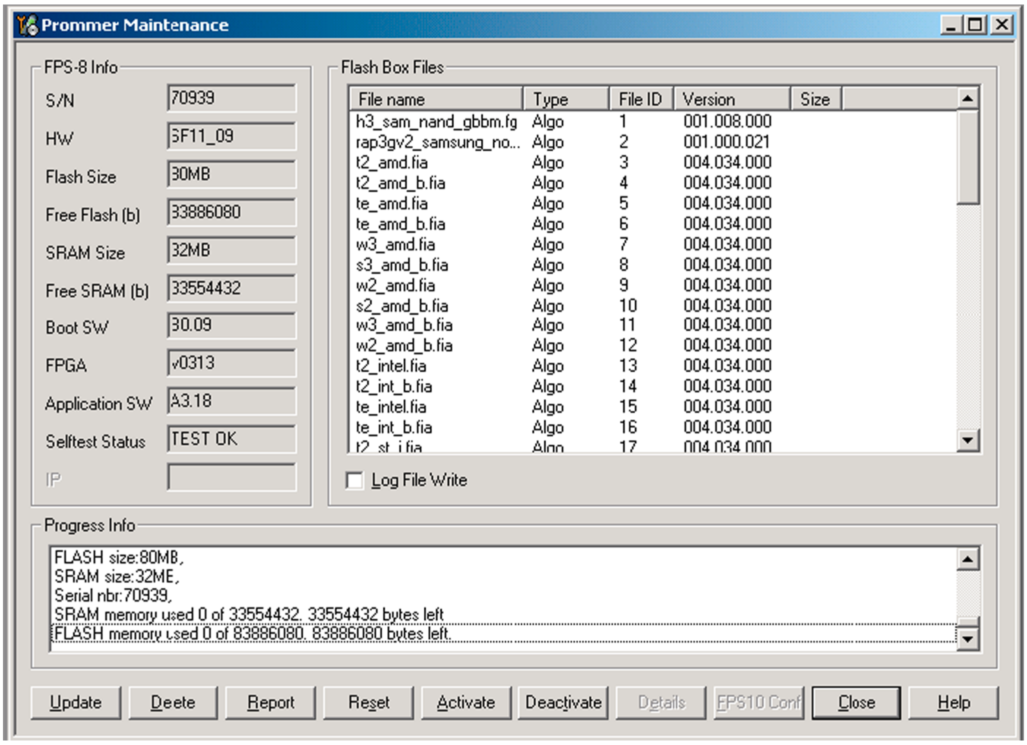
5. Click **OK**.



Prommer SW updated succesfully.

Figure 32 Prommer software update finished

6. To close the *Prommer Maintenance* window, click **Close**.



S/N 70939
HW 5F11_09
Flash Size 80MB
Free Flash (b) 83886080
SRAM Size 32MB
Free SRAM (b) 33554432
Boot SW 30.09
FPGA v0313
Application SW A3.18
Selftest Status TEST OK
IP

File name	Type	File ID	Version	Size
h3_sam_nand_gbbm.fg	Algo	1	001.008.000	
rap3gv2_samsung_no...	Algo	2	001.000.021	
t2_amd.fia	Algo	3	004.034.000	
t2_amd_b.fia	Algo	4	004.034.000	
te_amd.fia	Algo	5	004.034.000	
te_amd_b.fia	Algo	6	004.034.000	
w3_amd.fia	Algo	7	004.034.000	
s3_amd_b.fia	Algo	8	004.034.000	
w2_amd.fia	Algo	9	004.034.000	
s2_amd_b.fia	Algo	10	004.034.000	
w3_amd_b.fia	Algo	11	004.034.000	
w2_amd_b.fia	Algo	12	004.034.000	
t2_intel.fia	Algo	13	004.034.000	
t2_int_b.fia	Algo	14	004.034.000	
te_intel.fia	Algo	15	004.034.000	
te_int_b.fia	Algo	16	004.034.000	
t2_st_i.fia	Algo	17	004.034.000	

☐ Log File Write

```
FLASH size:80MB,
SRAM size:32MB,
Serial nbr:70939,
SRAM memory used 0 of 33554432, 33554432 bytes left
FLASH memory used 0 of 83886080, 83886080 bytes left.
```

Figure 33 *Prommer Maintenance* window

Activating FPS-8

Context

Before FPS-8 can be successfully used for phone programming, it must first be activated.

First fill in the *FPS-8 activation request* sheet in the FPS-8 sales package, and follow the instructions given.

When activation file is received (for example, *00000.in*), copy it to the *C:|ProgramFiles|Nokia|Phoenix |BoxActivation* directory on your computer (this directory is created when *Phoenix* is installed).

Steps

1. Start *Phoenix* service software.
2. Choose **Flashing→Prommer Maintenance** .
3. In the *Prommer Maintenance* window, click **Activate**.
4. To find the activation file, click **Browse**.
5. To activate the prommer, select the activation file and click **Open**.

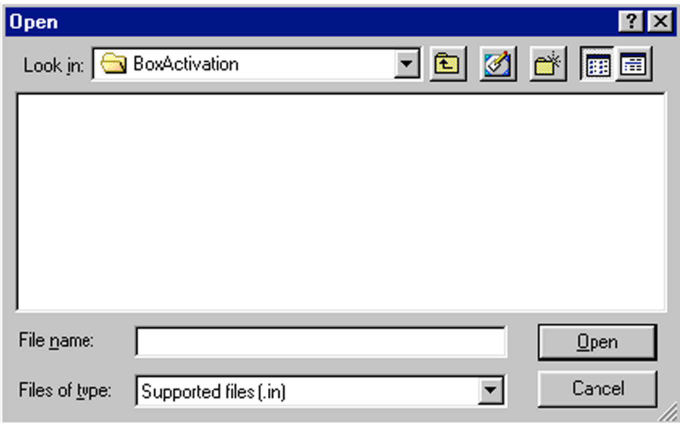


Figure 34 Box activation

6. To complete the activation, restart FPS-8.

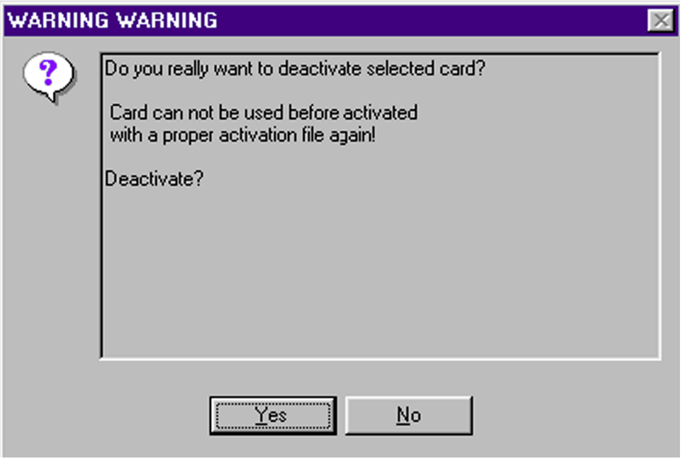
Deactivating FPS-8

Context

If there is, for example, a need to send the FPS-8 box for repair, it must be deactivated first.

Steps

1. Start *Phoenix* service software.
2. Choose **Flashing→Prommer Maintenance** .
3. In the *Prommer Maintenance* window, click **Deactivate**.
4. To confirm the deactivation, click **Yes**.


WARNING WARNING

Do you really want to deactivate selected card?

Card can not be used before activated
with a proper activation file again!

Deactivate?

Figure 35 Deactivation warning

The box is deactivated.

5. To complete the deactivation, restart FPS-8.

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4 — Service Tools and Service Concepts

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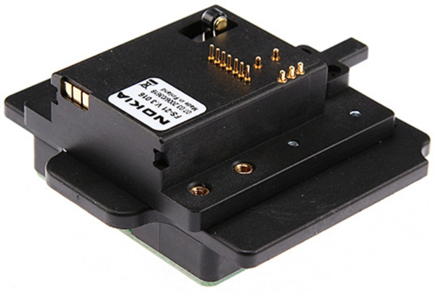
Service tools

Product specific tools

The table below gives a short overview of service tools that can be used for testing, error analysis and repair of product RM-146; RM-147; RM-174; RM-181, refer to various concepts.

<table>
<tr><td rowspan="2"></td><td>FS-21</td><td>Product specific adapter</td><td></td></tr>
<tr><td colspan="3">The product specific adapter can be used for assembled phones.
FS-21 is an interface between a phone and the concerning SS-46 or SS-62 device. It is needed in case the assembled phone needs to be contacted, except the DKU-2 or the CA-53 cable can be used (over USB).
Features include:
• Compatible to SS-46 (similar to DCT-4 flash adapter), supports flashing
• Compatible to SS-62 (similar to DCT-4 docking station adapter), a PC can be connected by using SS-46 or CU-4
  • Using SS-46: flashing is supported
  • Using CU-4: supports flashing, management calibration is supported.
  • SA-99 coupler can be attached for RF go/no-go tests
• Easy phone attachment and detachment
• Reliable phone locking
• Replaceable test pins</td></tr>
</table>

MJ-92	Module repair jig	

MJ-92 is meant for component level trouble shooting The jig includes RF interface for GSM and Bluetooth.

General features include:

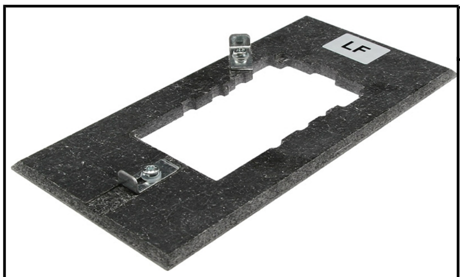
- Provides mechanical interface for engine module
- Provides galvanic connection to all needed test pads in module
- UI test interface
- Audio components MIC, earpiece, IHF
- Unlimited operation of a disassembled RM-146/147/174/181 phone module
- Power supply via CU-4

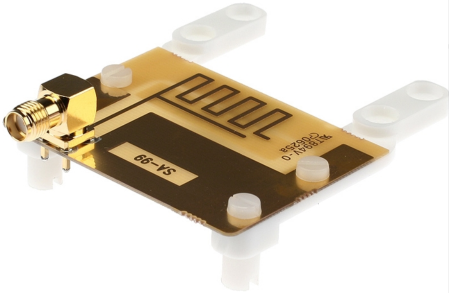
  Note: CU-4 is needed to operate MJ-92. CU-4 is not part of the MJ-92 sales package and has to be ordered separately.

- **Attenuation values for MJ-92**

Frequency (Hz)	Loss (dB)
836600000	0.14
881600000	0.14
897400000	0.14
942400000	0.14
1747800000	0.38
1842800000	0.34
1880000000	0.34
1950000000	0.31
1960000000	0.31
2140000000	0.44

The UI module is not installed because of logistic issues. The following parts must be installed (please refer to the Mechanical parts list): A2, I002, I003. I101, I102, I103, I104, I010, I105, A3, A4 and A5.

<table>
<tr><td rowspan="2"></td><td>RJ-109</td><td>Soldering jig</td><td></td></tr>
<tr><td colspan="3">This soldering jig is used for module level repair, either as fixation in µBGA rework places or when there is a need to hold a module on the work bench for any other repair.
Features include:
• Convenient locking mechanism
• Four (optional mount) rubber feet allow usage also on repair benches
• Fixation of phone module in both ways possible (bottom or top side up)
• ESD proof material
• Standard uBGA jig thickness and outer dimensions</td></tr>
</table>



SA-99	RF coupler	

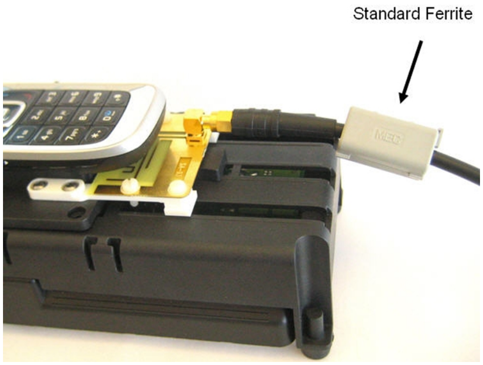
The SA-99 coupler is for GSM RF testing.

The RF antenna coupler for use with FS-21 and SS-62 interface adapter extends CU-4/SS-62/FS-21 set-up to allow RF function tests in GSM bands 850, 900, 1800 and 1900 MHz.

SA-99 is not suitable for RF tuning.

> **Note:** When using the coupler the phone shall be used in open mode.

To reduce noise, place the ferrite like shown in the picture below. (The ferrite is NOT a Nokia specific part, and can therefore not be ordered through the Nokia channel, but from any regular electronic vendor)



- **Table 12 Attenuation values for RM-146/147/174/181**

System	Channel	TX att [dB]	RX att [dB]
EGSM850	128	7.9	6
	190	7.6	7
	251	7.5	8
EGSM900	975	8	8
	38	8.3	8
	124	8.7	8
GSM1800	512	7.7	7
	698	7.2	6
	885	7.5	6
GSM1900	512	6.7	6
	700	6.4	6
	810	6.0	6

TX attenuation tolerance is +/- 1.0 dB

RX attenuation tolerance is +/- 1.0 dB

	SS-83	Domesheet alignment jig	
	The purpose of this tool is to simplify the attachment process of the domesheet to the keymat PWB and the display bezel the B-cover.		
	SS-88	Camera removal tool	
	The camera removal tool SS-88 is used to remove/attach the front camera module from/to the socket. It is used when removing the camera from RM-174/181		

General tools

The table below gives a short overview of service tools that can be used for testing, error analysis and repair of product RM-146; RM-147; RM-174; RM-181, refer to various concepts.

CU-4	Control unit	

CU-4 is a general service tool used with a module jig and/or a flash adapter. It requires an external 12 V power supply.

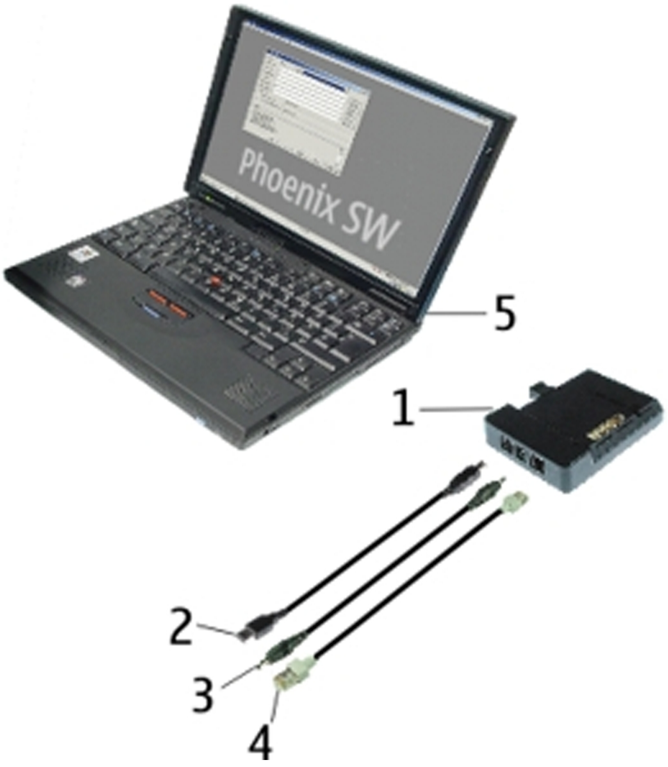
The unit has the following features:

- software controlled via USB
- EM calibration function
- Forwards FBUS/Flashbus traffic to/from terminal
- Forwards USB traffic to/from terminal
- software controlled BSI values
- regulated VBATT voltage
- 2 x USB2.0 connector (Hub)
- FBUS and USB connections supported

When using CU-4, note the special order of connecting cables and other service equipment:

Instructions

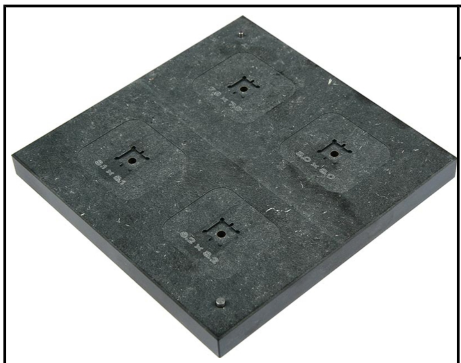
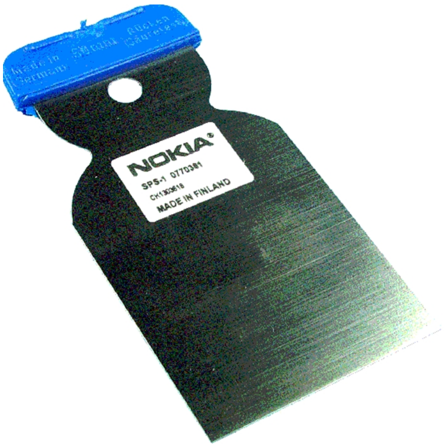
1 Connect a service tool (jig, flash adapter) to CU-4.
2 Connect CU-4 to your PC with a USB cable.
3 Connect supply voltage (12 V)
4 Connect an FBUS cable (if necessary).
5 Start Phoenix service software.

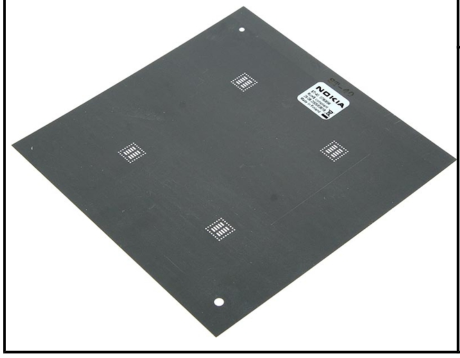


Note: Phoenix enables CU-4 regulators via USB when it is started.

Reconnecting the power supply requires a Phoenix restart.

<table>
<tr><td rowspan="2"> </td><td>FPS-10</td><td>Flash prommer</td><td></td></tr>
<tr><td colspan="3">FPS-10 interfaces with:
• PC
• Control unit
• Flash adapter
• Smart card
FPS-10 flash prommer features:
• Flash functionality for BB5 and DCT-4 terminals
• Smart Card reader for SX-2 or SX-4
• USB traffic forwarding
• USB to FBUS/Flashbus conversion
• LAN to FBUS/Flashbus and USB conversion
• Vusb output switchable by PC command
FPS-10 sales package includes:
• FPS-10 prommer
• Power Supply with 5 country specific cords
• USB cable</td></tr>
<tr><td rowspan="2"> </td><td>JBT-9</td><td>Bluetooth test and interface box (sales package)</td><td></td></tr>
<tr><td colspan="3">The JBT-9 test box is a generic service device used to perform Bluetooth bit error rate (BER) testing, and establishing cordless FBUS connection via Bluetooth. An ACP-8x charger is needed for BER testing and an AXS-4 cable in case of cordless interface usage testing .
Sales package includes:
• JBT-9 test box
• Installation and warranty information</td></tr>
<tr><td rowspan="2"> </td><td>PKD-1</td><td>SW security device</td><td></td></tr>
<tr><td colspan="3">SW security device is a piece of hardware enabling the use of the service software when connected to the parallel (LPT) port of the PC.
Without the device, it is not possible to use the service software.
Printer or any such device can be connected to the PC through the device if needed.</td></tr>
</table>

	RJ-93	Rework jig	
	RJ-93 is used as a rework jig for the engine module. This stencil takes the front end module (FEM) or power amplifier (PA) module for spreading the soldering paste to the component. Must be used together with the ST-40 stencil.		
	SPS-1	Soldering Paste Spreader	
	SRT-6	Opening tool	
	SRT-6 is used to open phone covers and B-to-B connectors.		
	SS-45	Front camera removal tool	
	The front camera removal tool SS-45 is used to remove/attach the front camera module from/to the socket.		

	SS-46	Interface adapter	
	SS-46 acts as an interface adapter between the flash adapter and FPS-10.		
	SS-62	Generic flash adapter base for BB5	
	• generic base for flash adapters and couplers • SS-62 equipped with a clip interlock system • provides standardised interface towards Control Unit • provides RF connection using galvanic connector or coupler • multiplexing between USB and FBUS media, controlled by VUSB		
	ST-40	PA rework stencil	
	This stencil is to be used together with RJ-93 and covering FEM module.		

Cables

The table below gives a short overview of service tools that can be used for testing, error analysis and repair of product RM-146; RM-147; RM-174; RM-181, refer to various concepts.

	CA-35S	Power cable	
	CA-35S is a power cable for connecting, for example, the FPS-10 flash prommer to the Point-Of-Sales (POS) flash adapter.		

<table>
<tr><td rowspan="2"> </td><td>DKE-2</td><td>Mini-USB cable</td><td></td></tr>
<tr><td colspan="3">USB to mini-USB connector cable.</td></tr>
<tr><td rowspan="2"> </td><td>PCS-1</td><td>Power cable</td><td></td></tr>
<tr><td colspan="3">The PCS-1 power cable (DC) is used with a docking station, a module jig or a control unit to supply a controlled operating voltage.</td></tr>
<tr><td rowspan="2"> </td><td>XCS-4</td><td>Modular cable</td><td></td></tr>
<tr><td colspan="3">XCS-4 is a shielded (one specially shielded conductor) modular cable for flashing and service purposes.</td></tr>
<tr><td rowspan="2"> </td><td>XRE-2</td><td>Bluetooth cable</td><td></td></tr>
<tr><td colspan="3">The bluetooth cable connects the bluetooth connector of the module jig to the bluetooth test box JBT-9.</td></tr>
</table>

<table>
<tr><td rowspan="2"> </td><td>XRF-1</td><td>RF cable</td><td></td></tr>
<tr><td colspan="3">The RF cable is used to connect, for example, a module repair jig to the RF measurement equipment.
SMA to N-Connector ca. 610mm.
Attenuation for:
• GSM850/900: 0.3+-0.1 dB
• GSM1800/1900: 0.5+-0.1 dB
• WLAN: 0.6+-0.1dB</td></tr>
</table>

Service concepts

POS (Point of Sale) flash concept

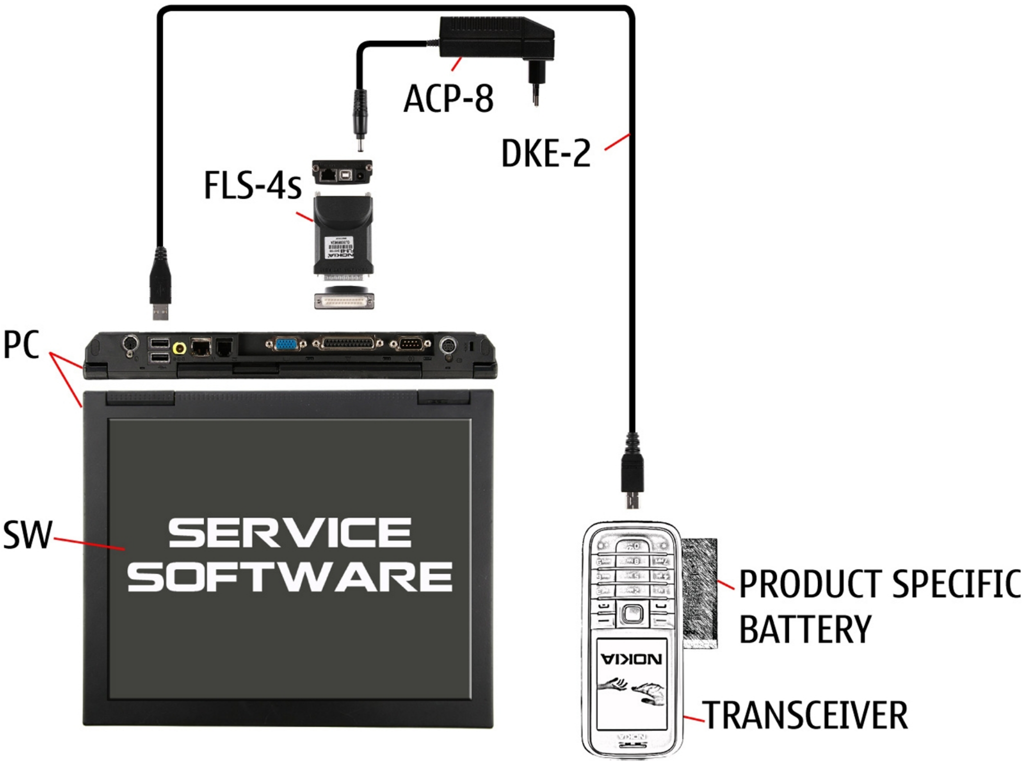

ACP-8
DKE-2
FLS-4s
PC
SW
SERVICE SOFTWARE
PRODUCT SPECIFIC BATTERY
TRANSCEIVER

Figure 36 POS flash concept

Type	Description
Product specific tools	
BL-5B	Battery
Other tools	
ACP-8	Power adapter
FLS-4S or FLS-5	POS flash dongle
	PC with Phoenix service software
Cables	

Type	Description
DKE-2	USB connectivity cable

Flash concept with FPS-10

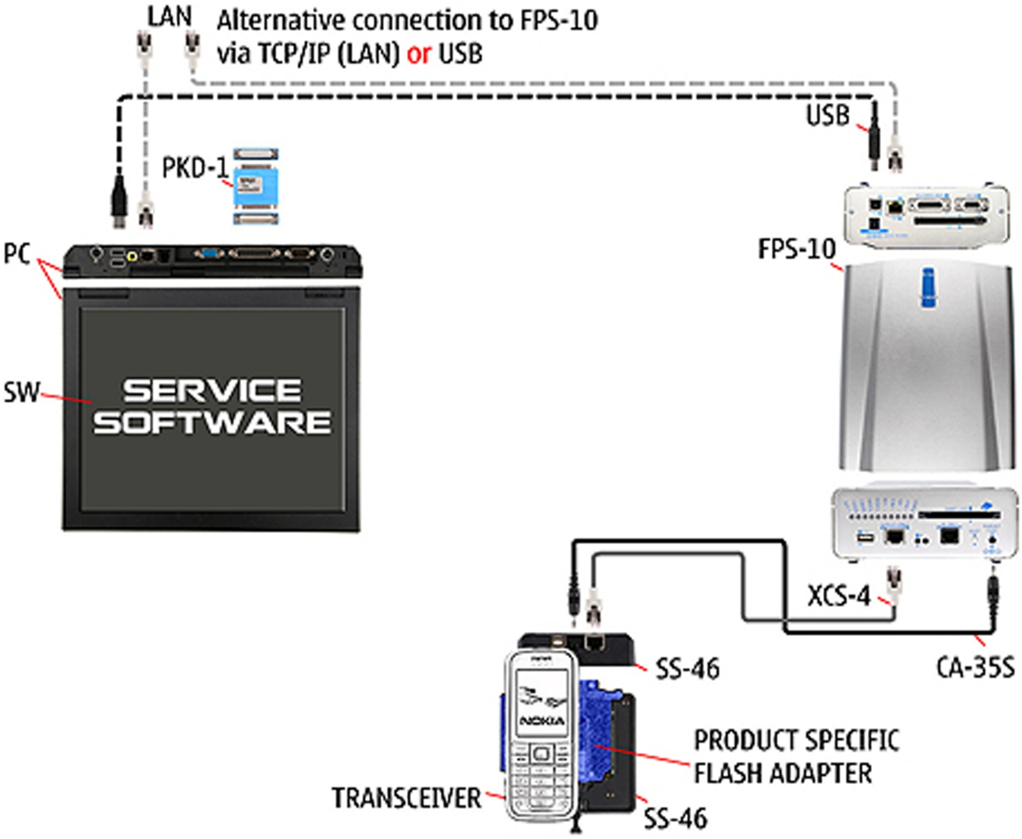

LAN
Alternative connection to FPS-10
via TCP/IP (LAN) or USB
USB
PKD-1
PC
FPS-10
SW
SERVICE
SOFTWARE
XCS-4
SS-46
CA-35S
PRODUCT SPECIFIC
FLASH ADAPTER
TRANSCEIVER
SS-46

Figure 37 Basic flash concept with FPS-10

Type	Description
Product specific tools	
FS-21	Flash adapter
Other tools	
FPS-10	Flash prommer box
PKD-1/PK-1	SW security device
SS-46	Interface adapter
	PC with Phoenix service software
Cables	
XCS-4	Modular cable
CA-35S	Power cable
	USB cable

CU-4 flash concept with FPS-10

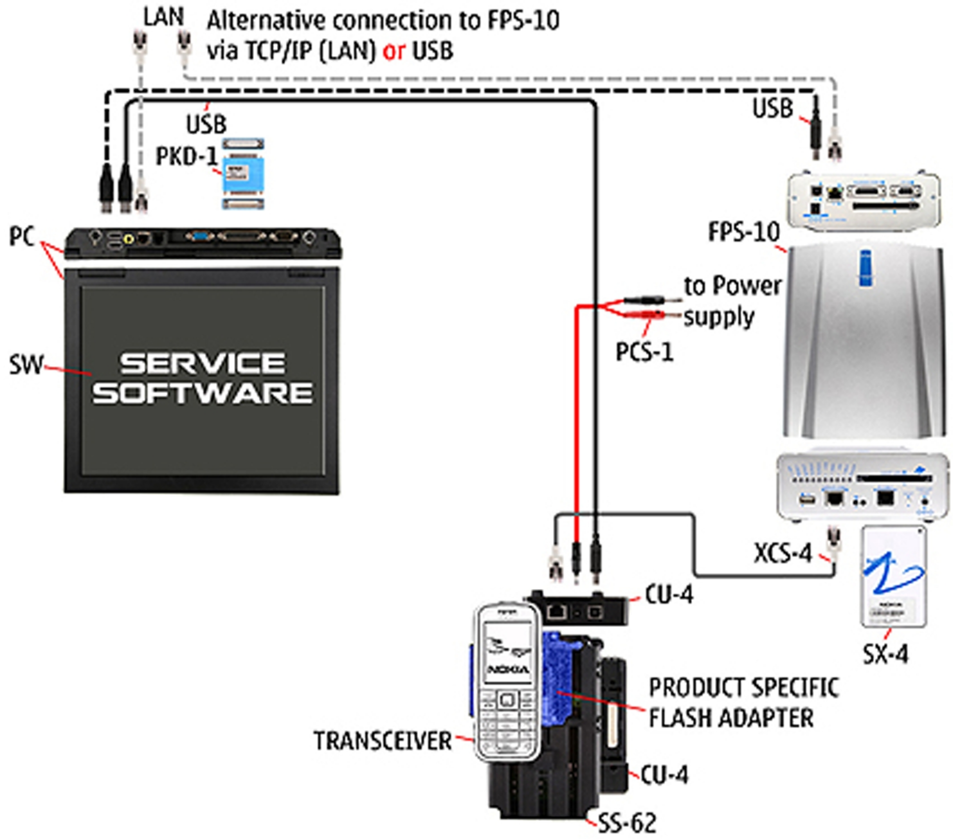

LAN
Alternative connection to FPS-10
via TCP/IP (LAN) or USB
USB
USB
PKD-1
PC
SW
SERVICE SOFTWARE
FPS-10
to Power supply
PCS-1
XCS-4
CU-4
SX-4
PRODUCT SPECIFIC FLASH ADAPTER
TRANSCEIVER
CU-4
SS-62

Figure 38 CU-4 flash concept with FPS-10

Type	Description
Product specific tools	
FS-21	Flash adapter
Other tools	
CU-4	Control unit
FPS-10	Flash prommer box
PKD-1/PK-1	SW security device
SS-62	Flash adapter base
SX-4	Smart card
	PC with Phoenix service software
Cables	
PCS-1	Power cable
XCS-4	Modular cable
	Standard USB cable
	USB cable

Module jig service concept

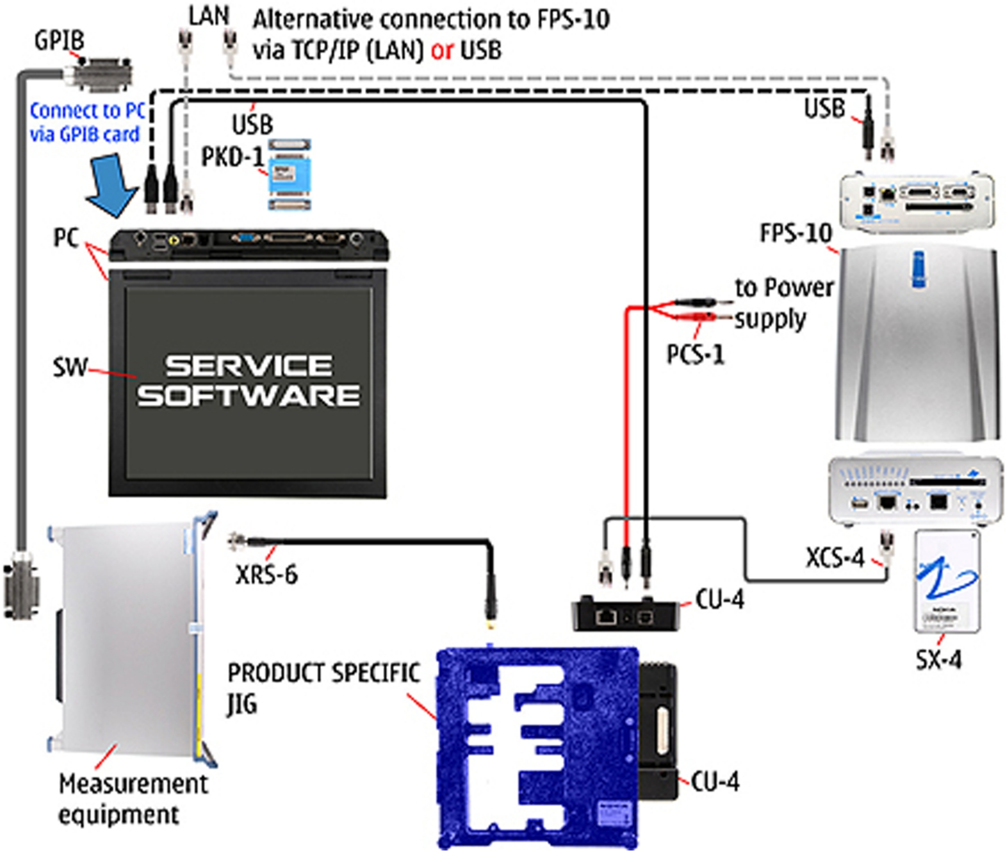

LAN
Alternative connection to FPS-10
via TCP/IP (LAN) or USB
GPIB
Connect to PC
via GPIB card
USB
PKD-1
USB
FPS-10
PC
to Power
supply
PCS-1
SW
SERVICE
SOFTWARE
XRS-6
XCS-4
CU-4
SX-4
PRODUCT SPECIFIC
JIG
CU-4
Measurement
equipment

Figure 39 Module jig service concept

Type	Description
Phone specific tools	
MJ-92	Module jig
Other tools	
CU-4	Control unit
FPS-10	Flash prommer box
PKD-1/PK-1	SW security device
SX-4	Smart card
	PC with Phoenix service software
	Measurement equipment
Cables	
PCS-1	DC power cable
XCS-4	Modular cable
XRS-6	RF cable
	USB cable

Type	Description
	GPIB control cable

RF testing concept with RF coupler

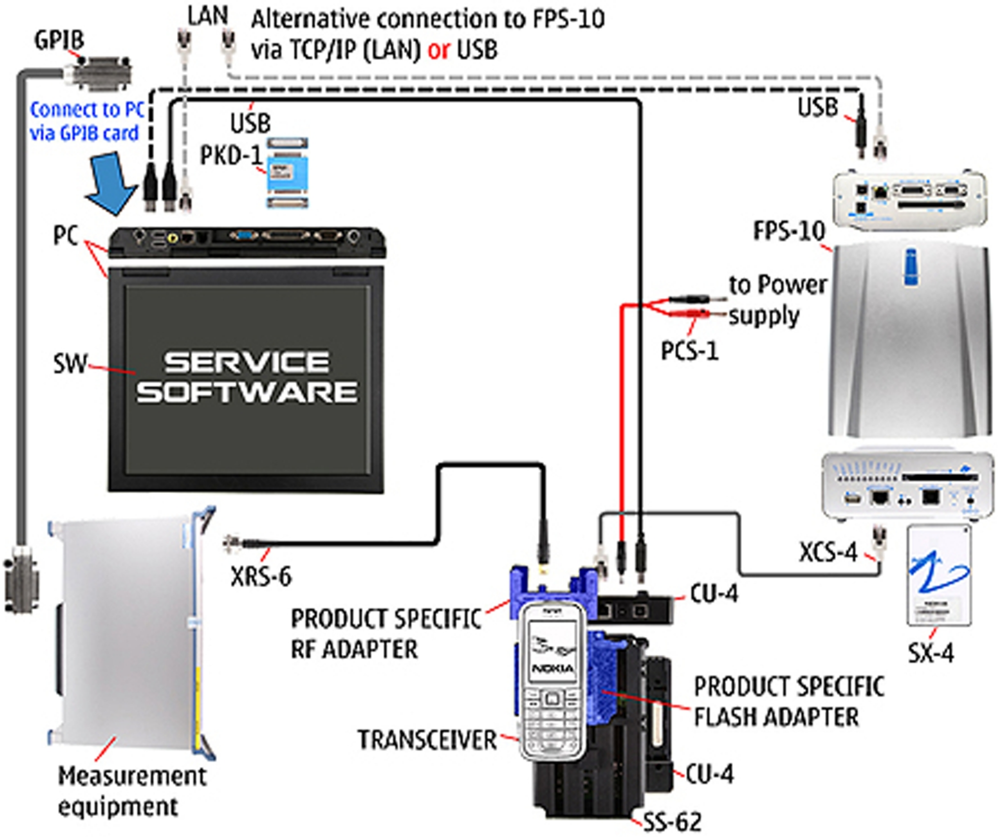

GPIB
LAN
Alternative connection to FPS-10
via TCP/IP (LAN) or USB
Connect to PC
via GPIB card
USB
PKD-1
USB
PC
FPS-10
to Power
supply
PCS-1
SW
SERVICE
SOFTWARE
XRS-6
XCS-4
CU-4
PRODUCT SPECIFIC
RF ADAPTER
SX-4
PRODUCT SPECIFIC
FLASH ADAPTER
TRANSCEIVER
CU-4
SS-62
Measurement
equipment

Figure 40 RF testing concept with RF coupler

Type	Description
Product specific tools	
FS-21	Flash adapter
SA-99	RF coupler
Other tools	
CU-4	Control unit
SX-4	Smart card
FPS-10	Flash prommer box
PKD-1/PK-1	SW security device
SS-62	Flash adapter base
	Measurement equipment
	PC with Phoenix service software
Cables	
PCS-1	Power cable

Type	Description
XCS-4	Modular cable
XRS-6	RF cable
	GPIB control cable
	USB cable

Service concept for RF testing and RF/BB tuning

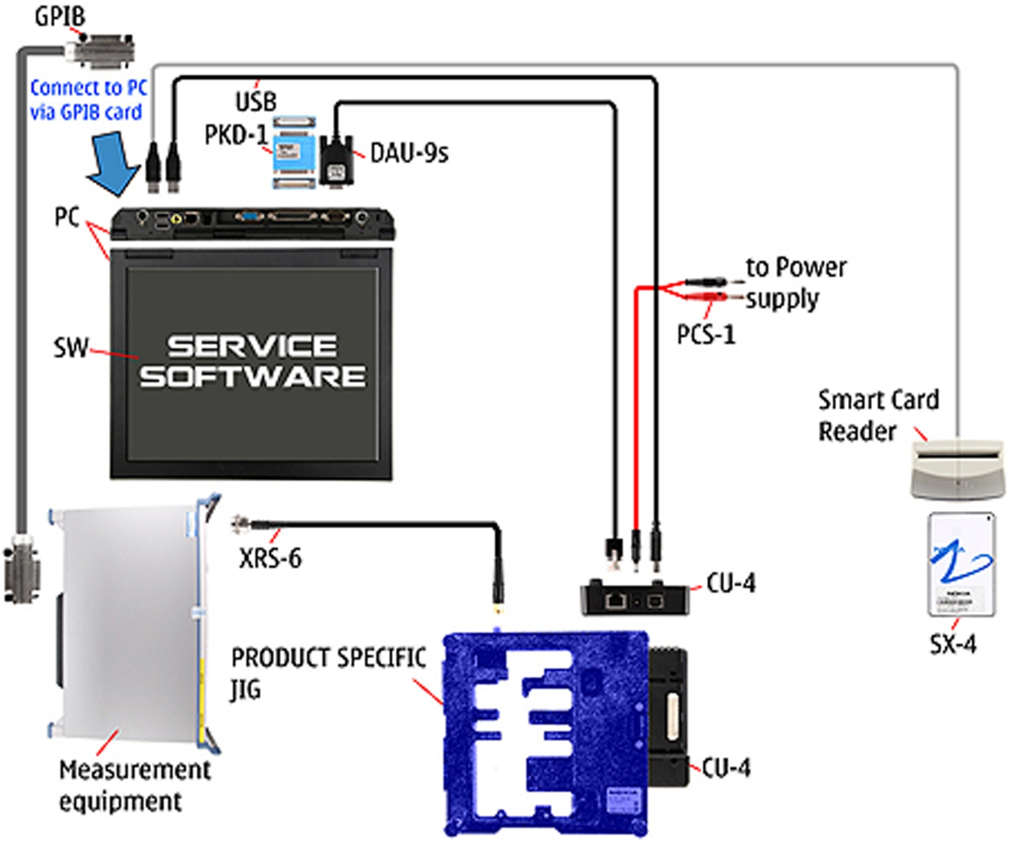

GPIB
Connect to PC via GPIB card
USB
PKD-1
DAU-9s
PC
SW
SERVICE SOFTWARE
to Power supply
PCS-1
Smart Card Reader
XRS-6
CU-4
SX-4
PRODUCT SPECIFIC JIG
CU-4
Measurement equipment

Figure 41 Service concept for RF testing and RF/BB tuning

Type	Description
Product specific tools	
MJ-92	Module jig
Other tools	
CU-4	Control unit
SX-4	Smart card
	Measurement equipment
	Smart card reader
	PC with Phoenix service software
Cables	

Type	Description
DAU-9s	MBUS cable
PCS-1	DC power cable
PKD-1/PK-1	SW security device
XRS-6	RF cable
	GPIB control cable
	USB cable

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5 — Disassembly and reassembly instructions

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Table of Contents

Upper block disassembly instruction....................5–5
Upper block reassembly instruction....................5–14
Lower block disassembly instruction....................5–26
Lower block reassembly instruction....................5–32

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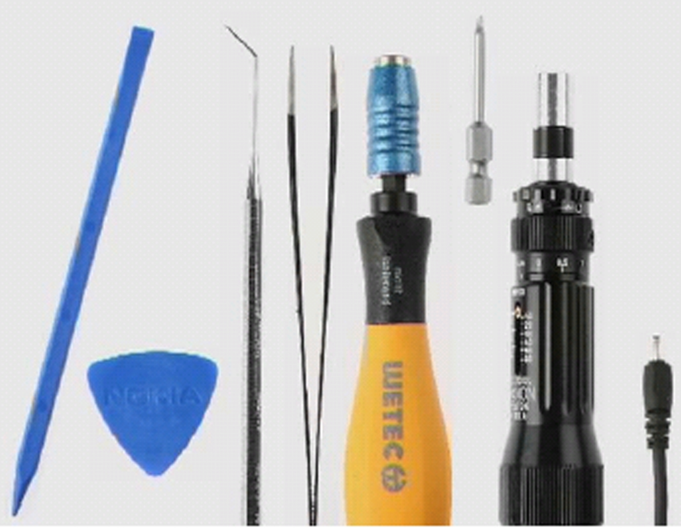
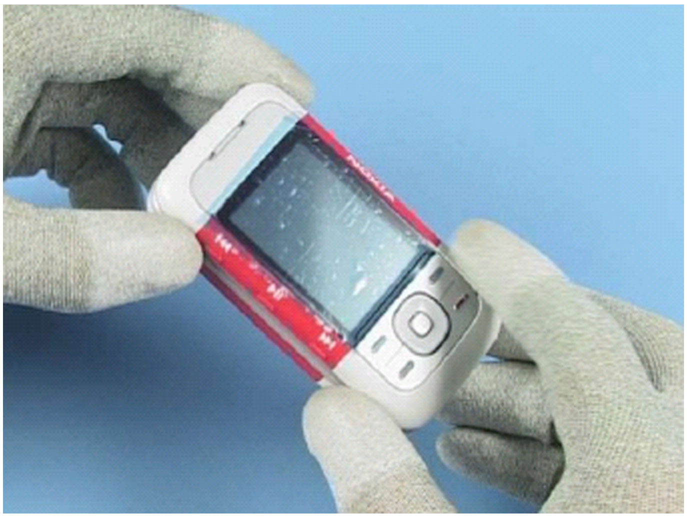
Upper block disassembly instruction

Steps

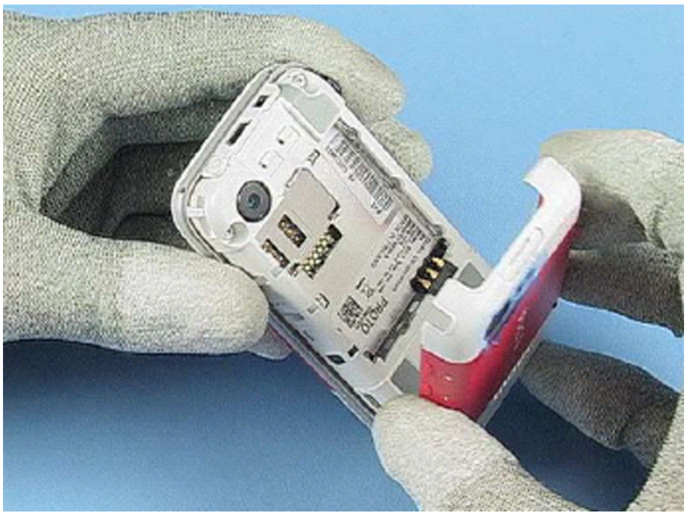
1. Needed tools: The SS-93, the dental pick, metal tweezers, a bit holder with a Torx Plus size 6 bit, a torque driver, and a DC plug.



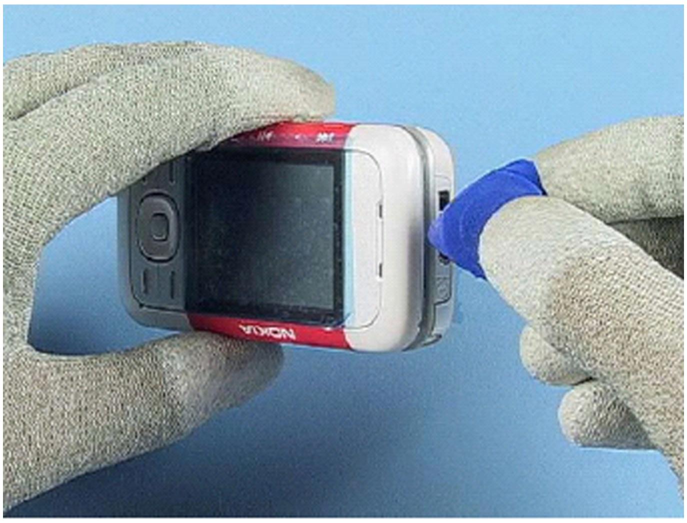
2. Always cover the windows with a protective film.



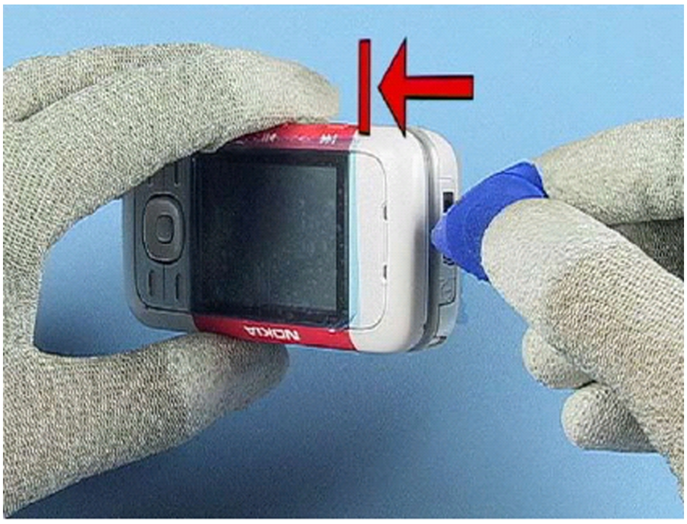
3. Open the E-COVER Assembly. Remove the battery if it is still inserted.



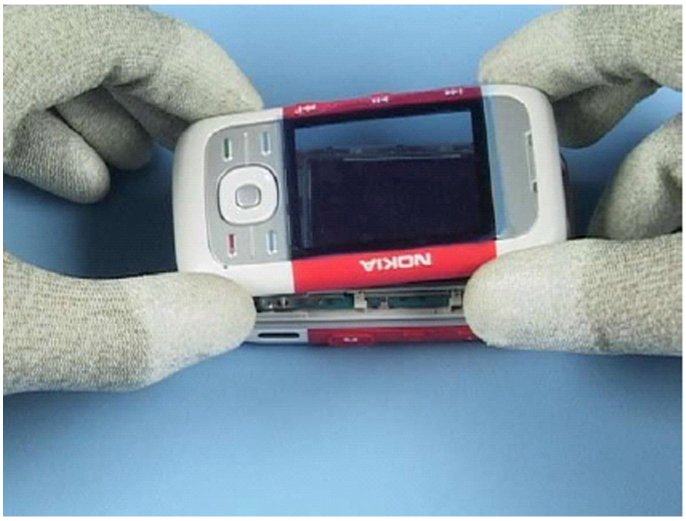
4. Use the SRT-6 to pry open the A-COVER assembly.



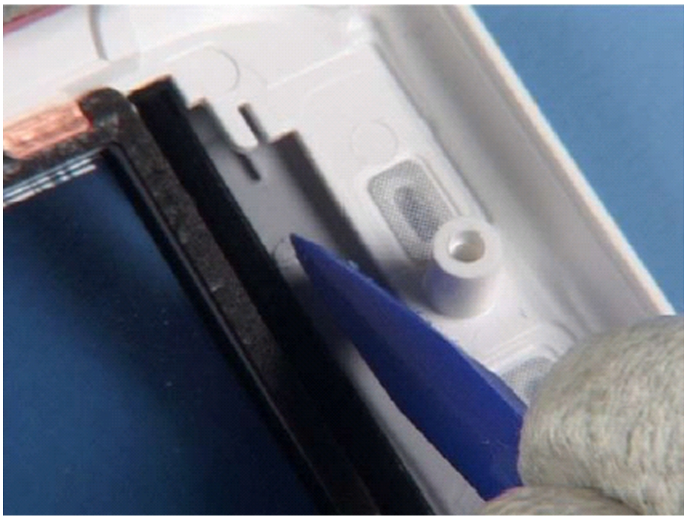
5. Use the SRT-6 only in direction shown. Do not shift the SRT-6 along the side where the keys are located.



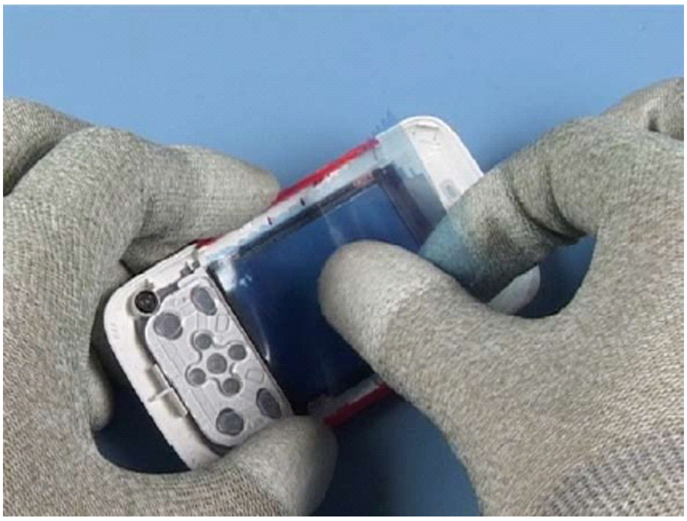
6. Lift up the A-COVER Assembly.



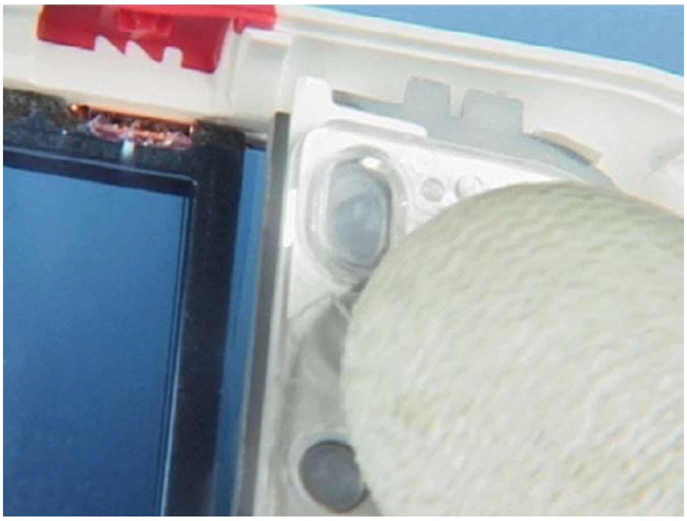
7. The A-COVER DECORATION can now pushed out without the risk of damaging the A-COVER.



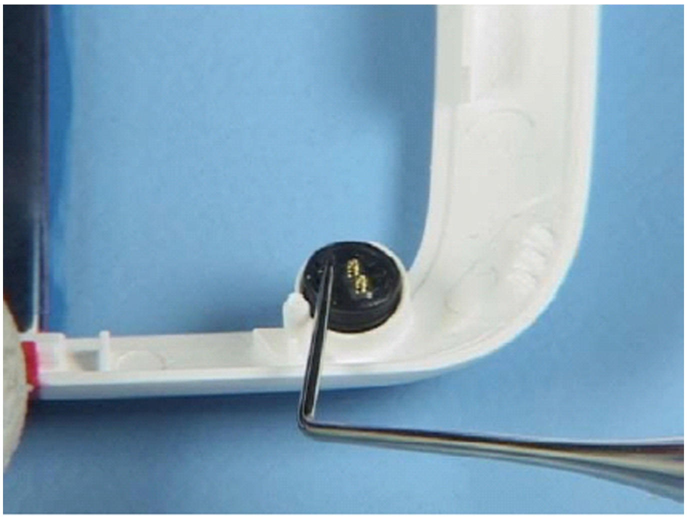
8. Cover the window from inner side with a protective film.



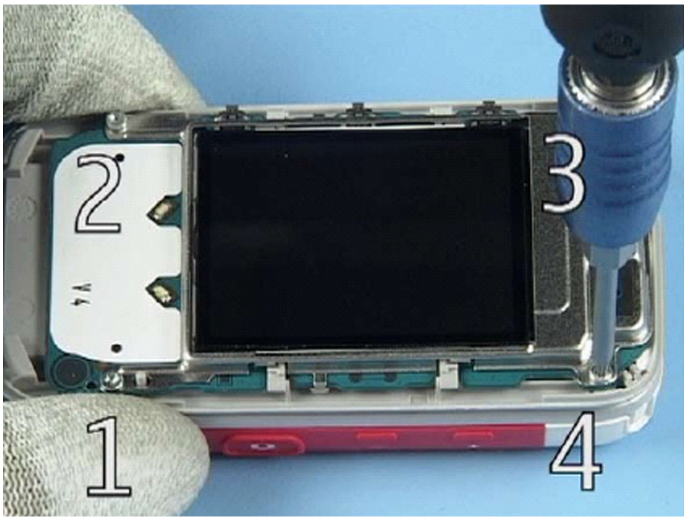
9. Release and remove the FUNCTIONAL KEYMAT.



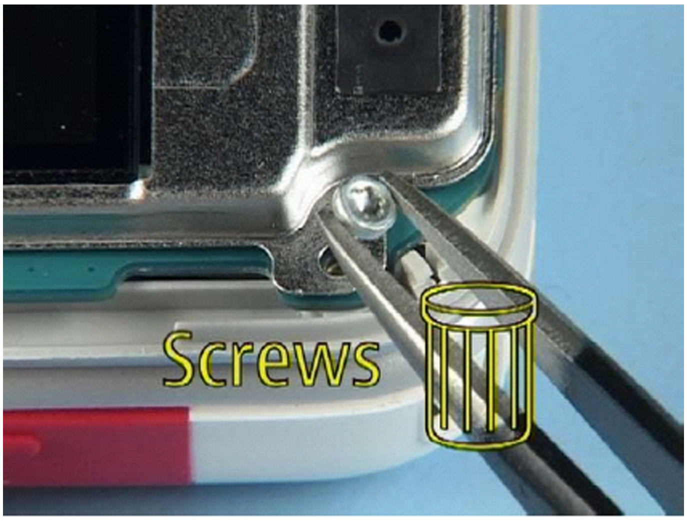
10. Ease out the MICROPHONE with the dental pic.



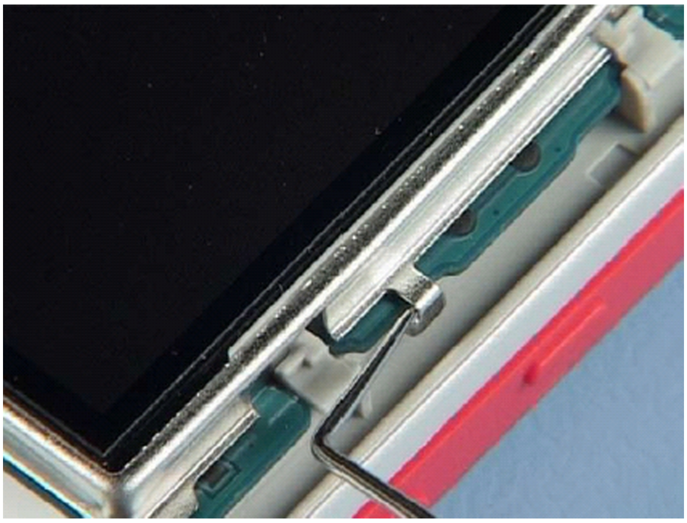
11. Unscrew the four screws in the order shown.



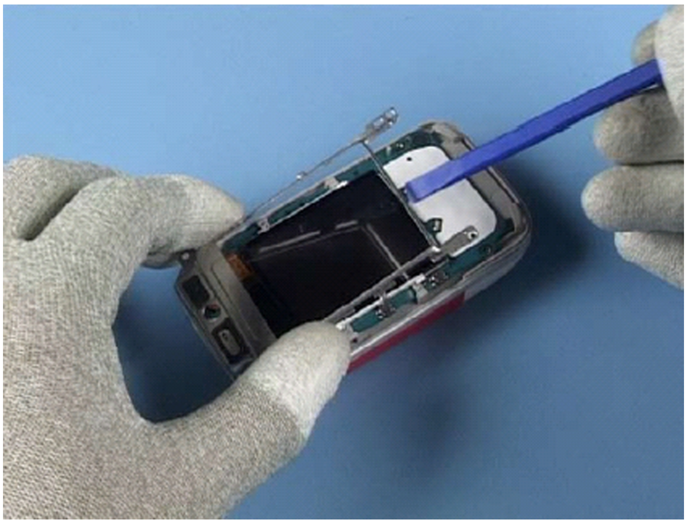
12. Remove all screws and discard them. Do not use them again.



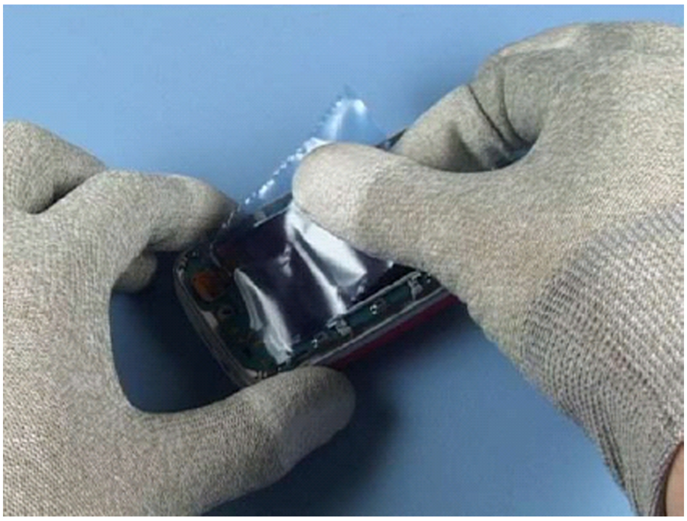
13. Carefully unlock both latches.



14. Lift up the UI SHIELD assembly.



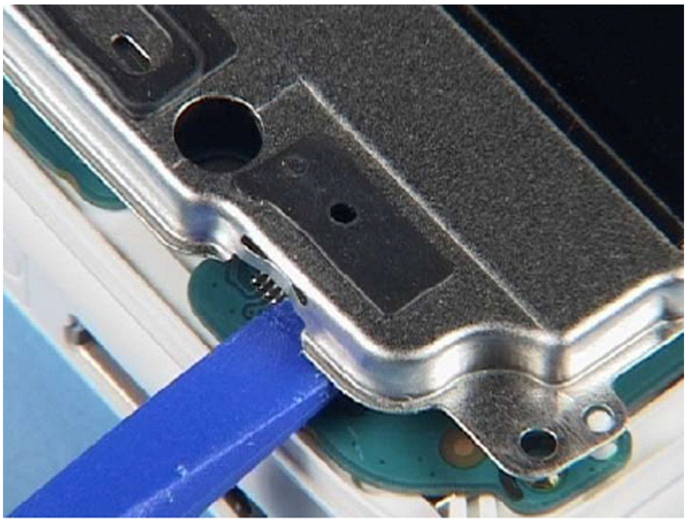
15. Cover the LCD Module with a protective film.



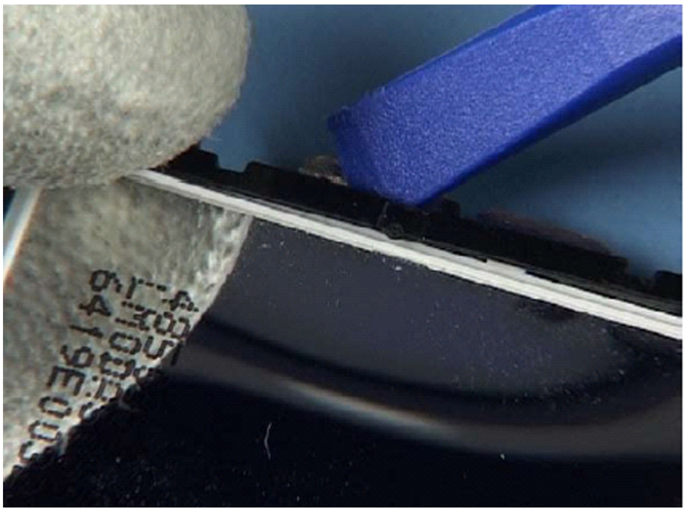
16. Nokia 5200 add-ons

5200
add-ons

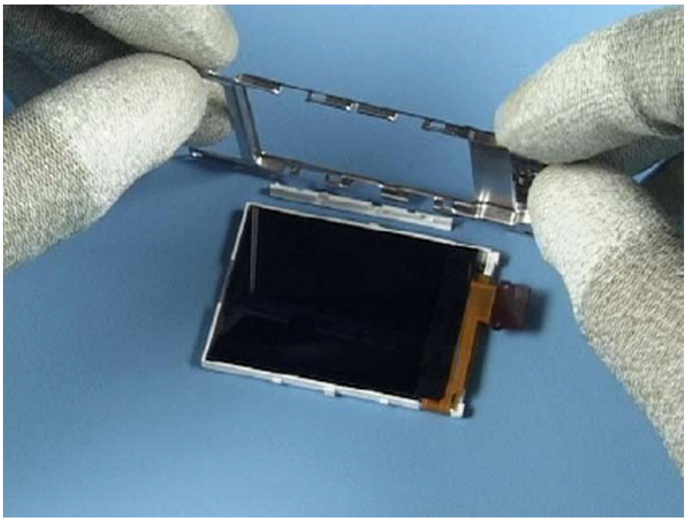
17. After removing the screws carefully disconnect the LCD MODULE connector with the SS-93.



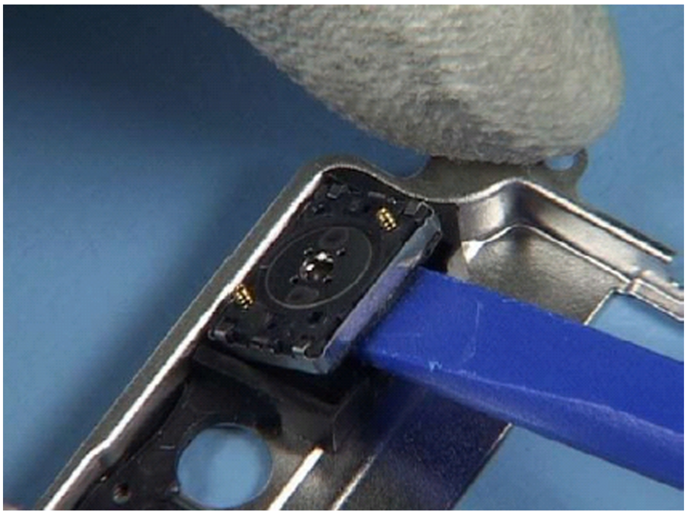
18. Carefully lever out one LCD ADAPTER with the SS-93.



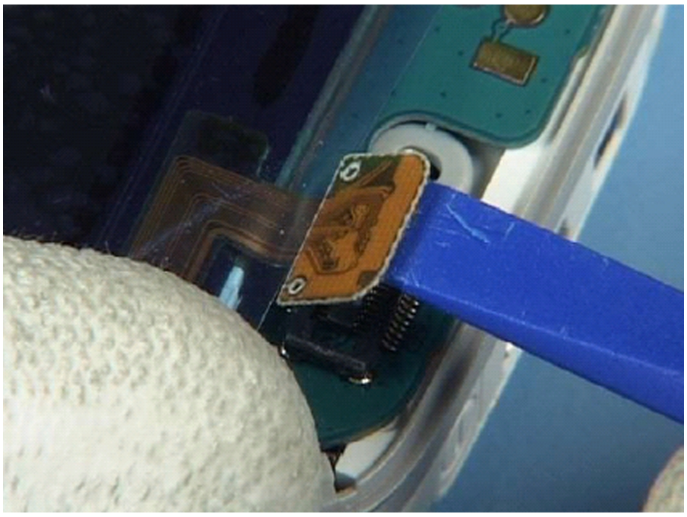
19. Now the LCD MODULE can be released from the UI SHIELD.



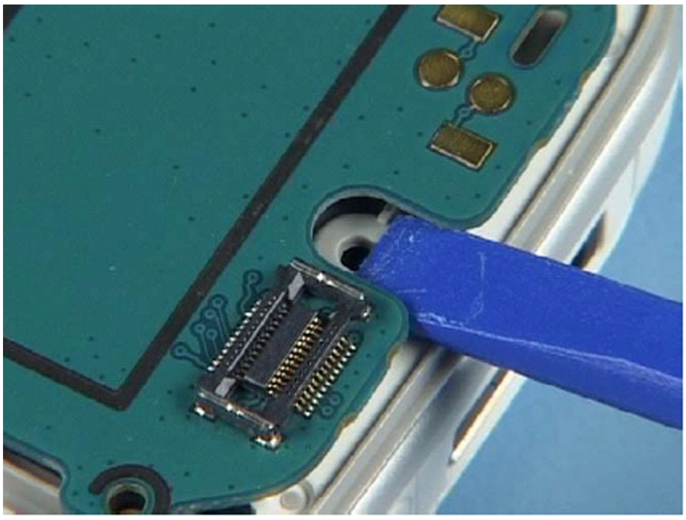
20. Lever out the EARPIECE.



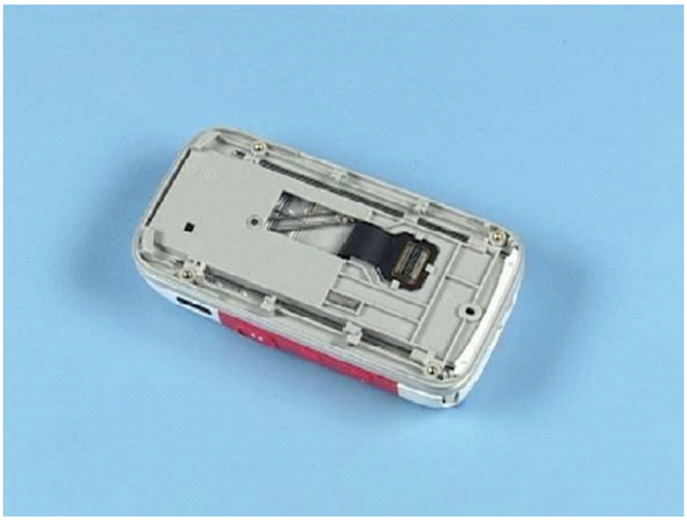
21. Open the Flex Connector of the LCD MODULE.



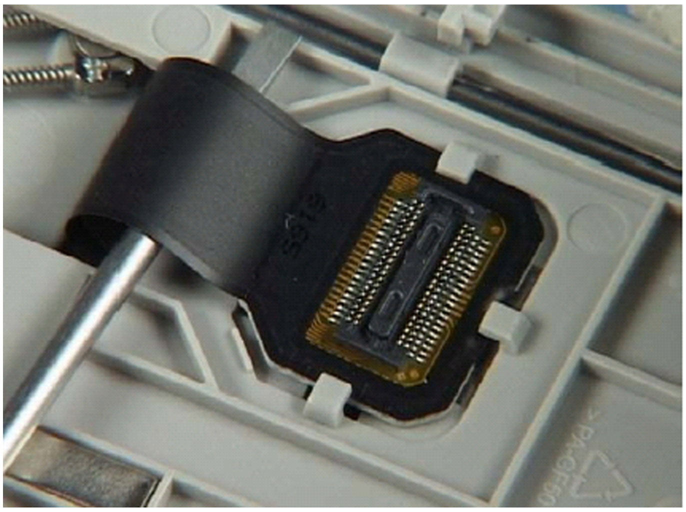
22. Carefully lever up the TG UI MODULE. This will disconnect the hidden B to B connector.



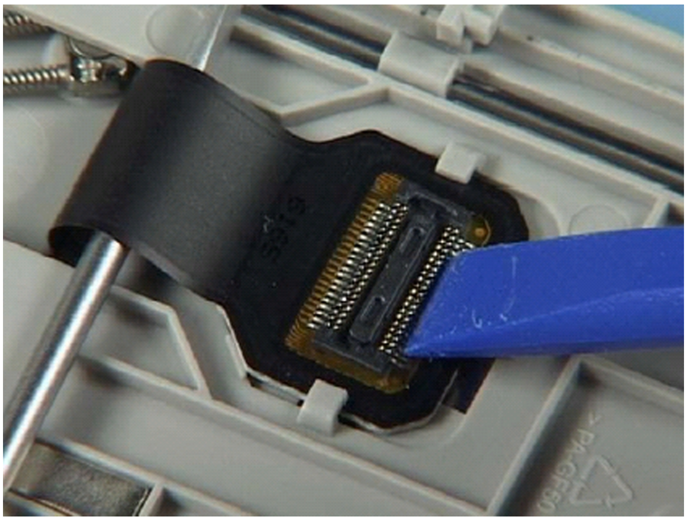
23. To remove the SIDE FLEX both parts of the phone must be disassembled first.



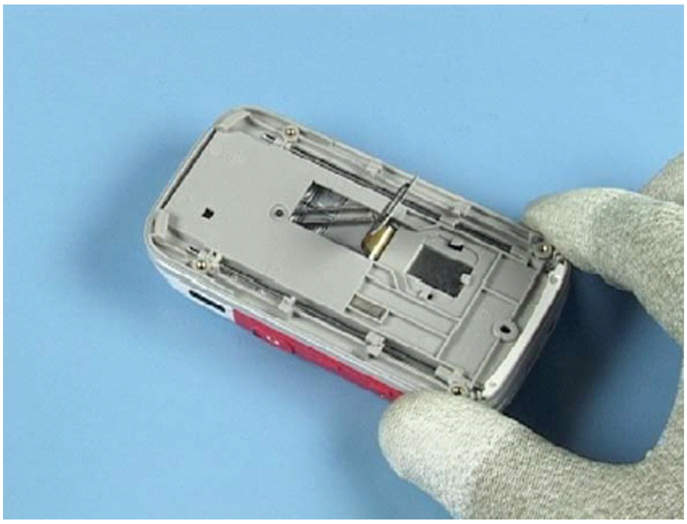
24. Start removing the connector of the SIDE FLEX by lifting it up as shown first.



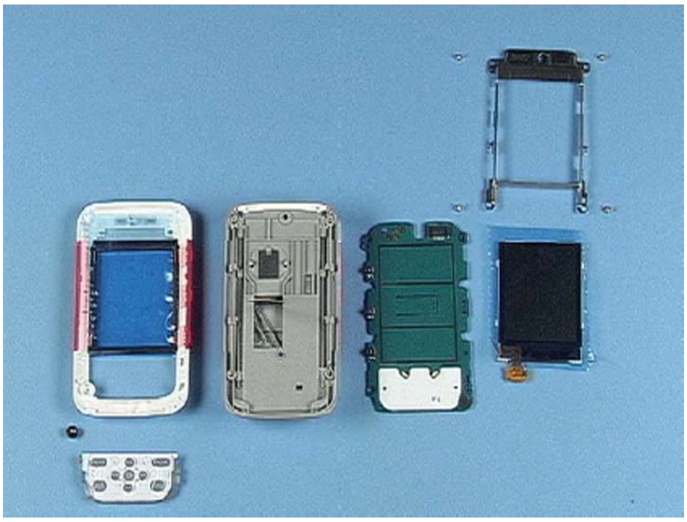
25. Then carefully shift it with the SS-93 as shown.



26. After disassembling the upper part the SIDE FLEX can be removed easily.



27. The disassembly of the upper part is now completed.

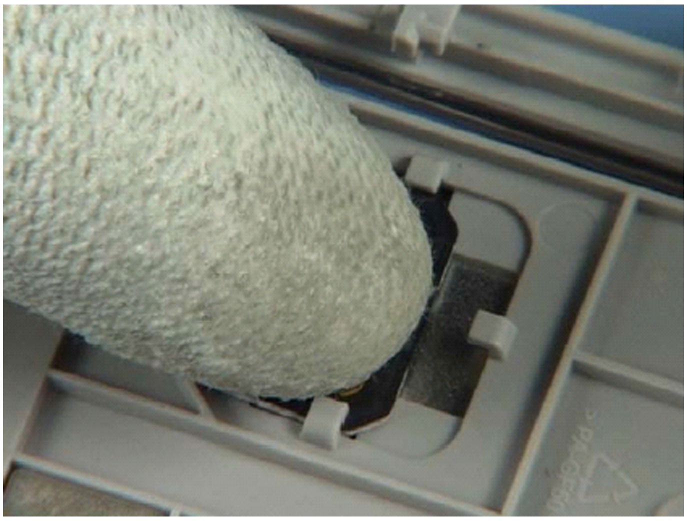


Upper block reassembly instruction

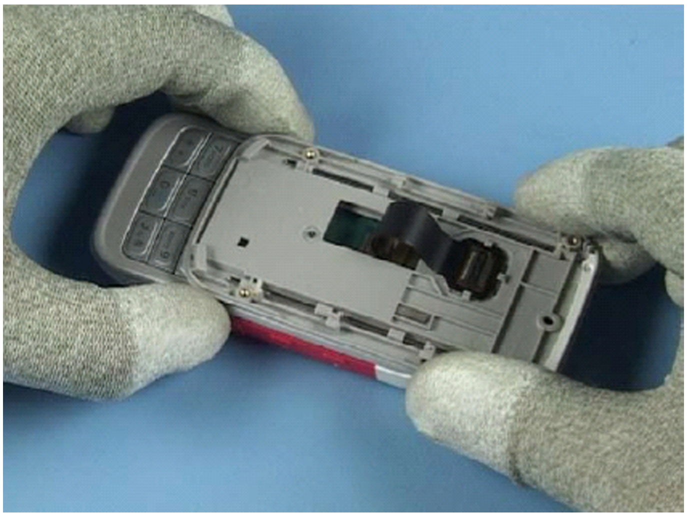
Steps

1. Assembly

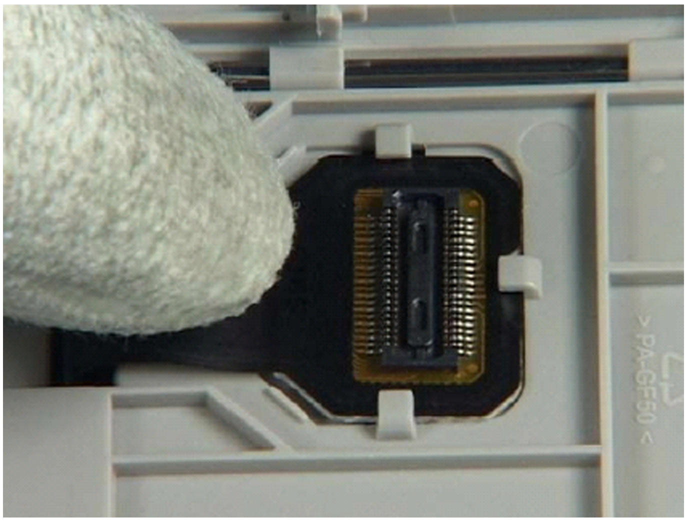
2. Place the SIDE FLEX into its compartment.



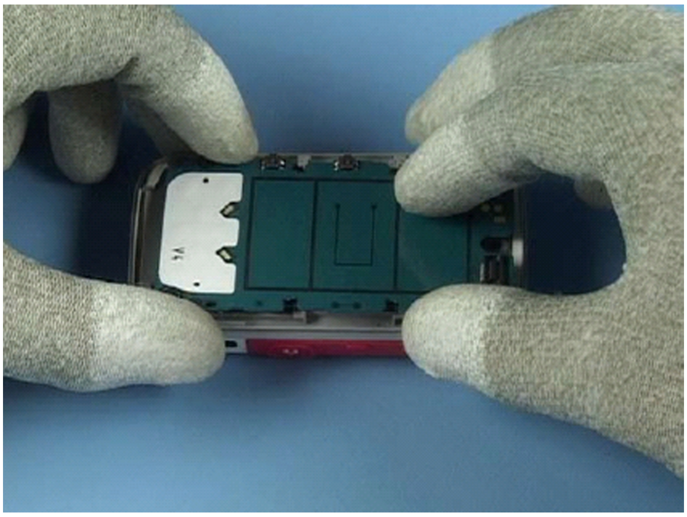
3. Now close the slide mechanism.



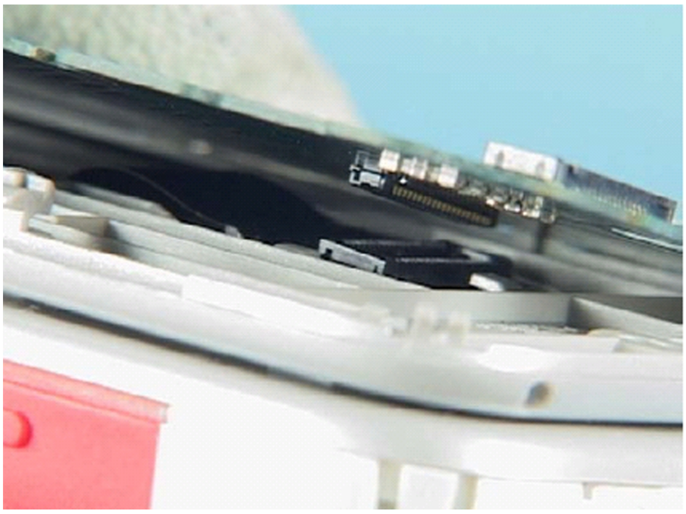
4. Push the connector into position shown.



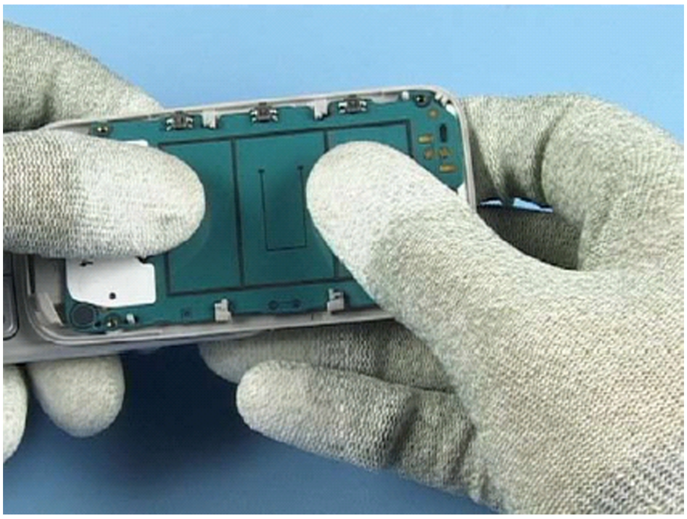
5. Place the UI MODULE exactly as shown.



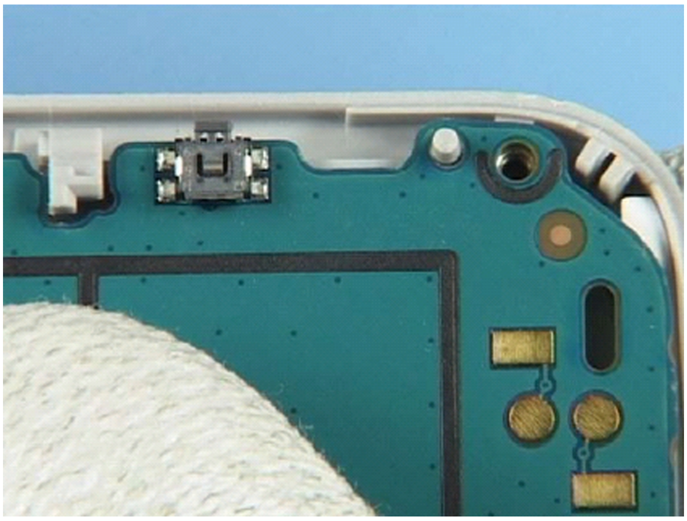
6. Check the positioning of the connector before continue.



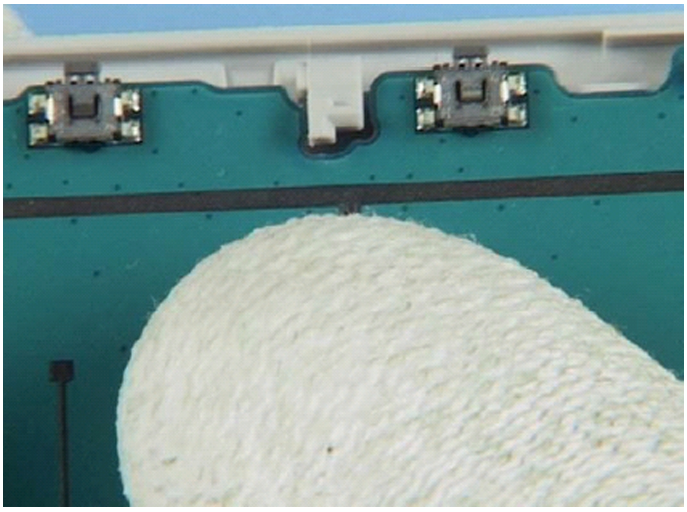
7. Push down the UI MODULE while opening the slide mechanism.



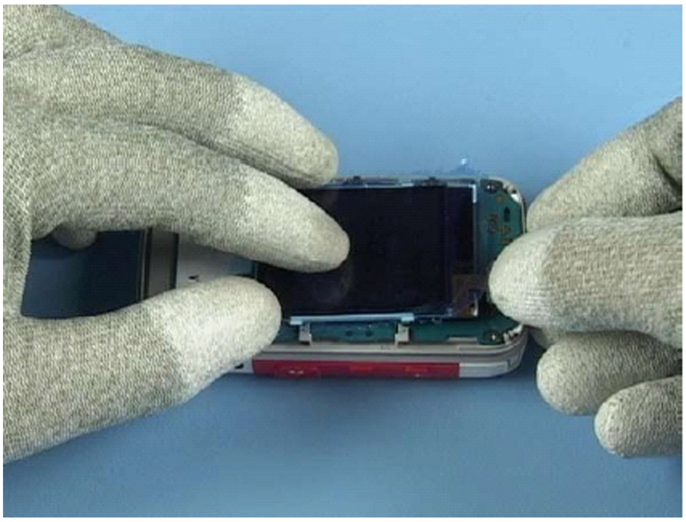
8. Check the position of the UI MODULE again.



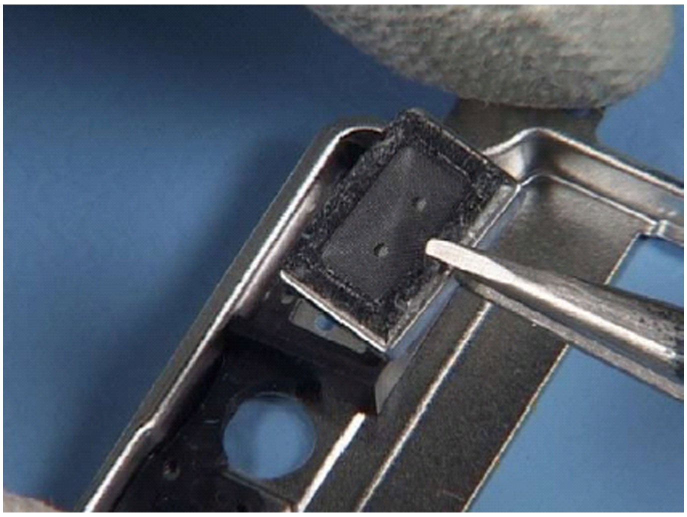
9. Now close the hidden connector.



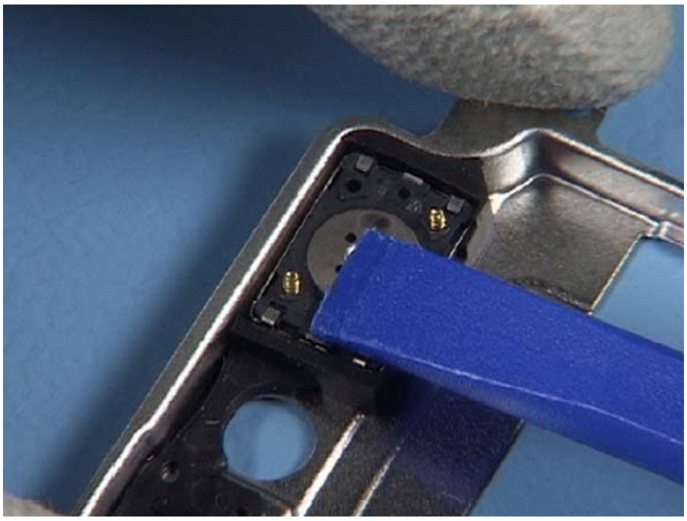
10. Position the LCD MODULE and close the connector.



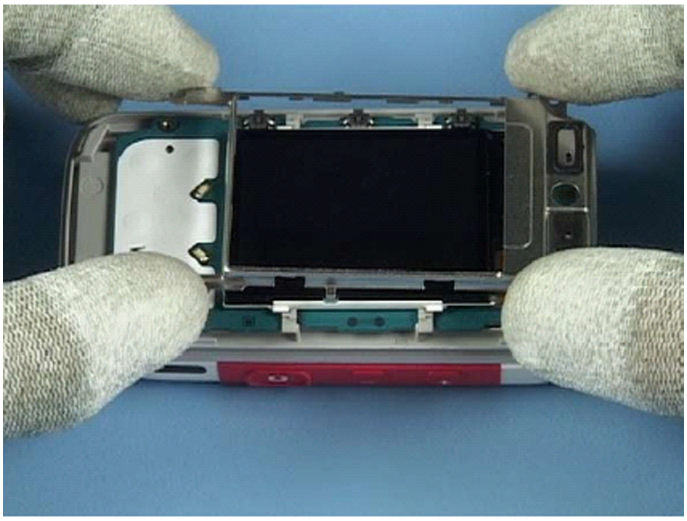
11. Insert the EARPIECE, always fit a new adhesive when replacing the EARPIECE.



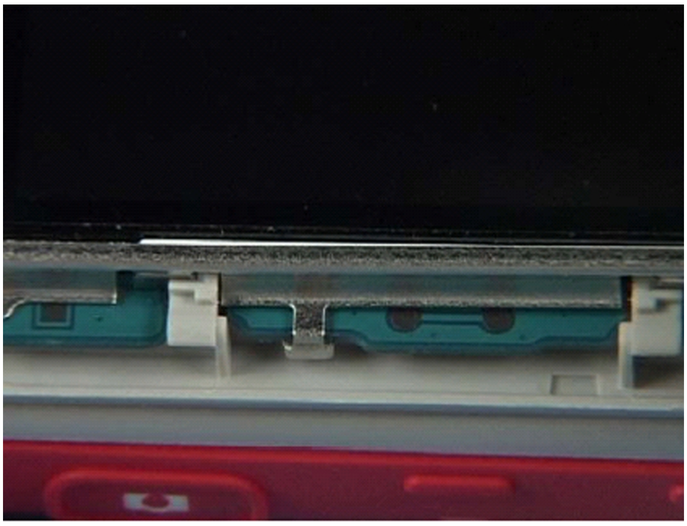
12. Push it down evenly.



13. Now place the UI SHIELD over the assembly as shown.



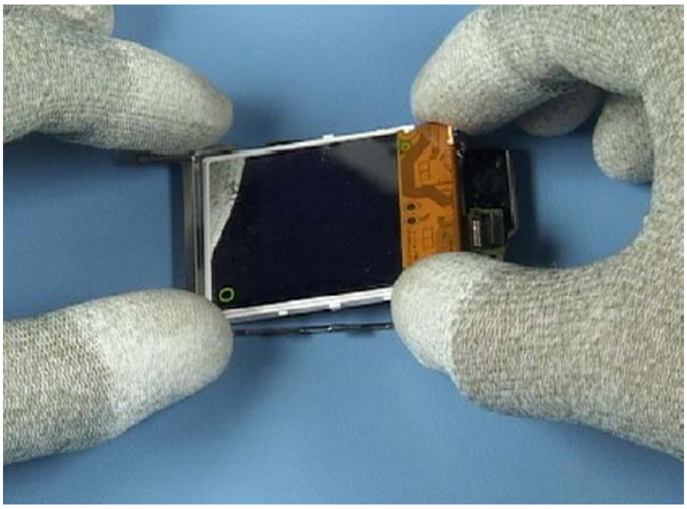
14. Mind that the two snaps are clicked into their places.



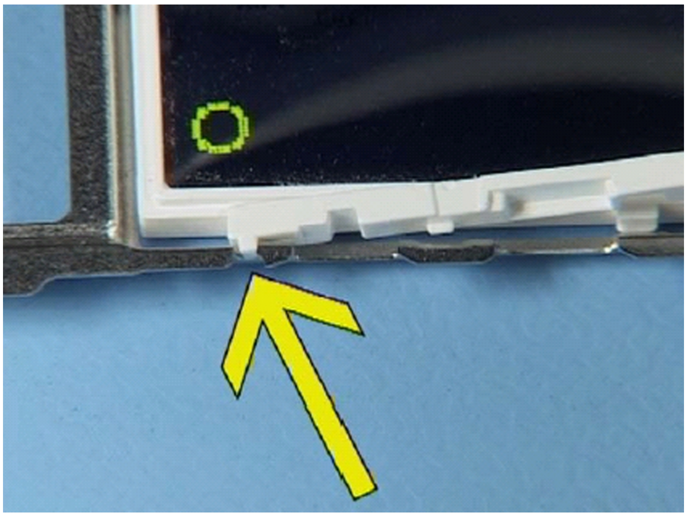
15. Nokia 5200 add-ons.

5200
add-ons

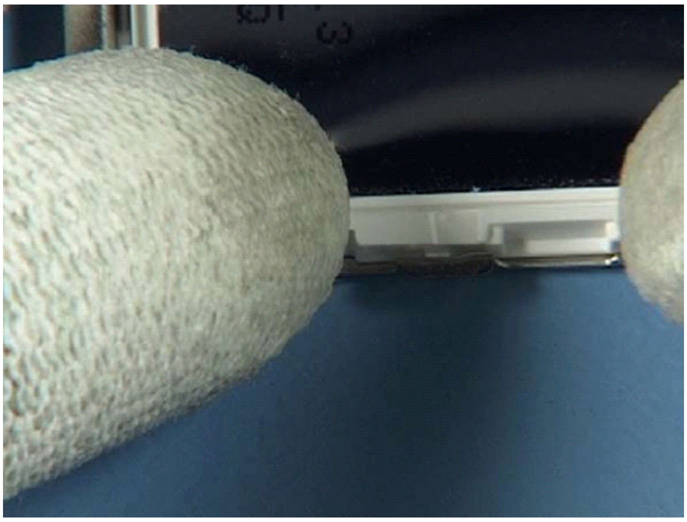
16. Peel up the protection film from the LCD and place it into the UI SHIELD.



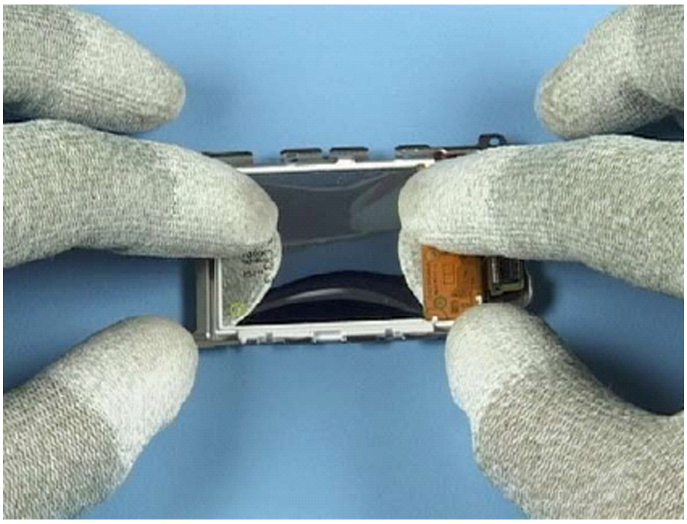
17. Insert the first LCD ADAPTER and push it into its place.



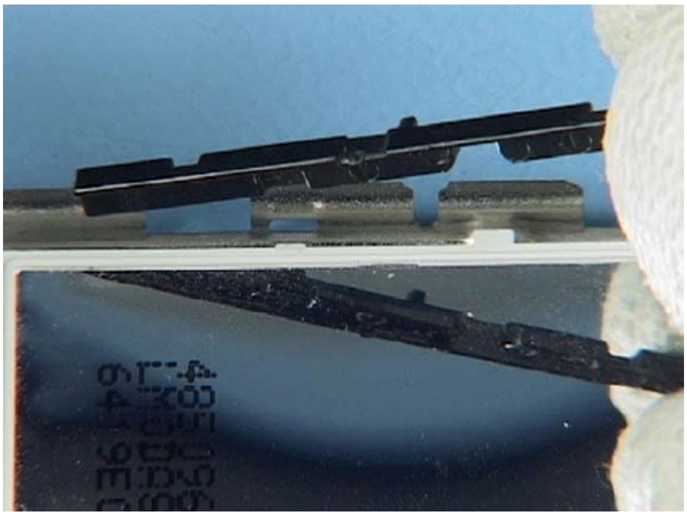
18. Mind the guide while pushing down evenly.



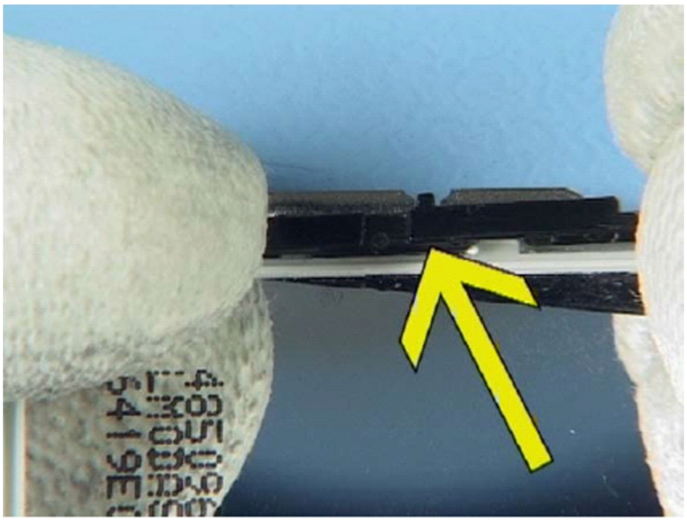
19. Slightly shift down the LCD MODULE as shown.



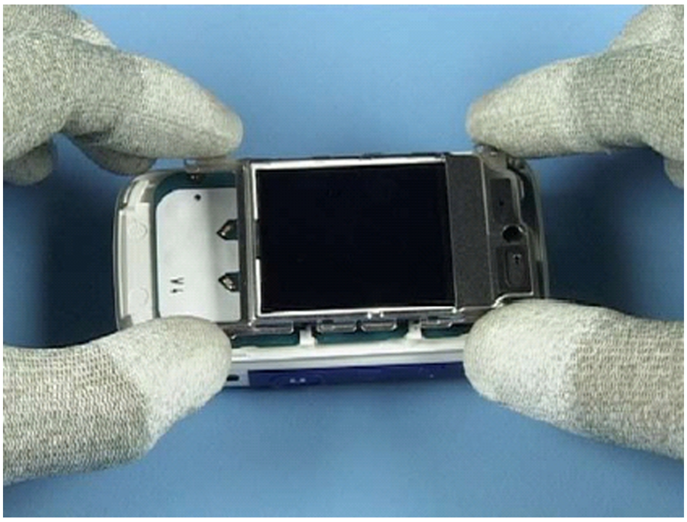
20. Insert the opposite LCD ADAPTER now.



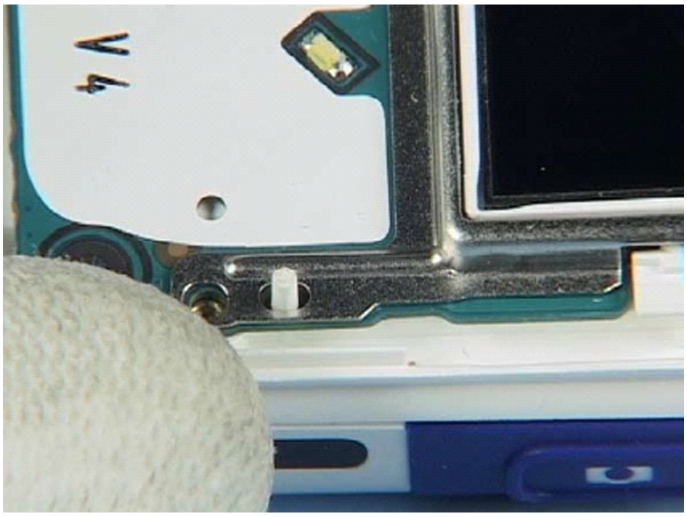
21. Mind the guide and push it down evenly.



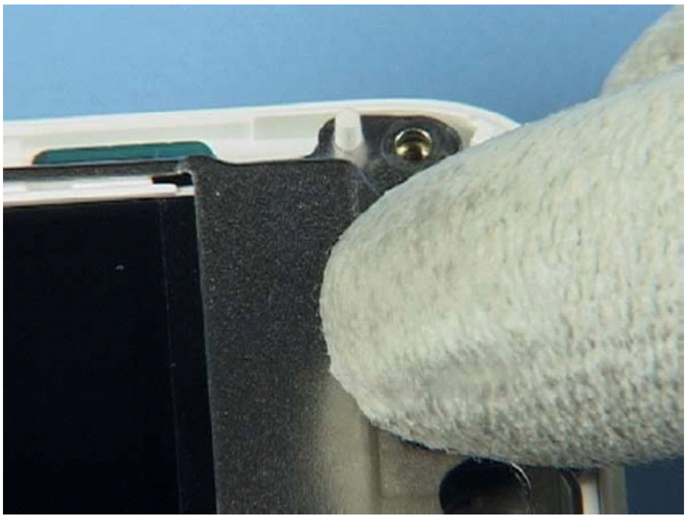
22. Now place the UI SHIELD over the assembly as shown.



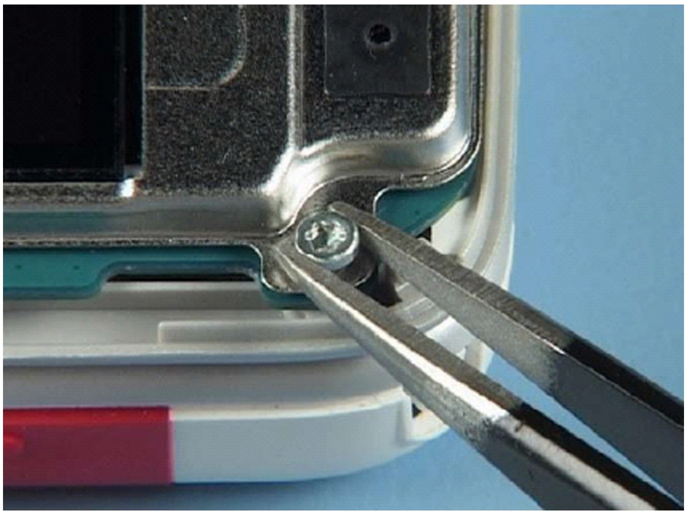
23. Mind the guides.



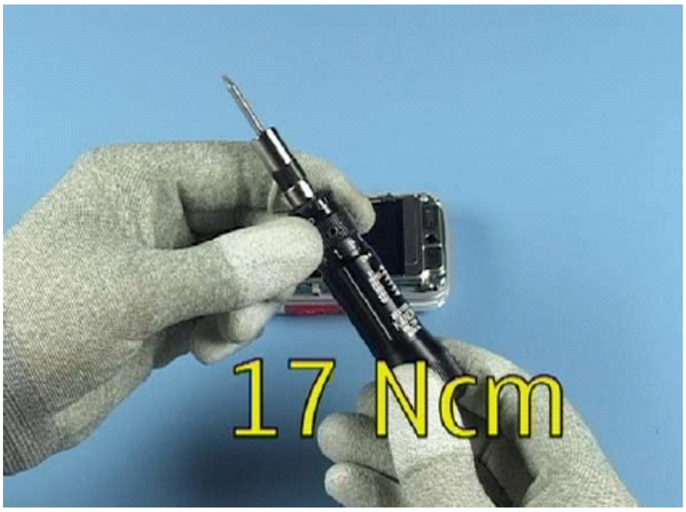
24. Close the LCD Module connector.



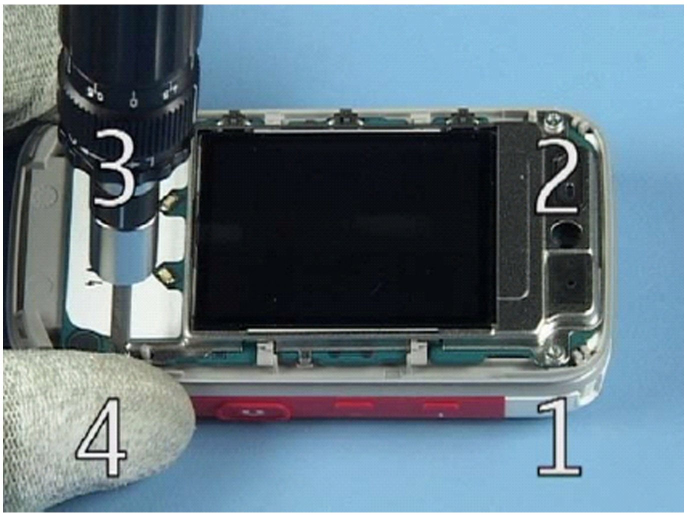
25. Insert the screws.



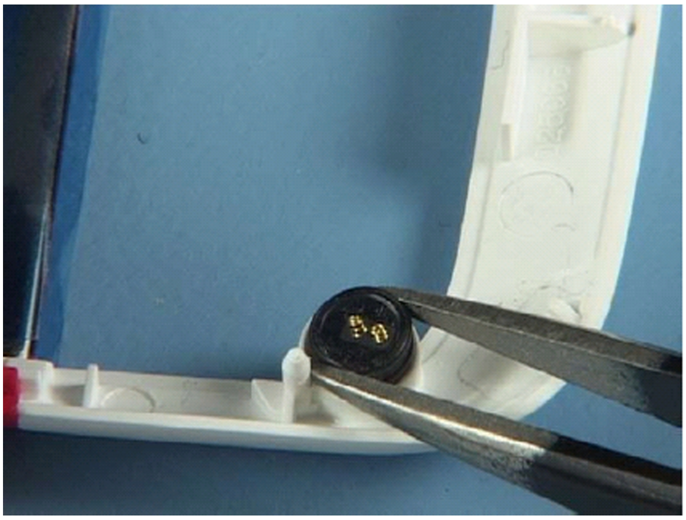
26. Set the correct torque.



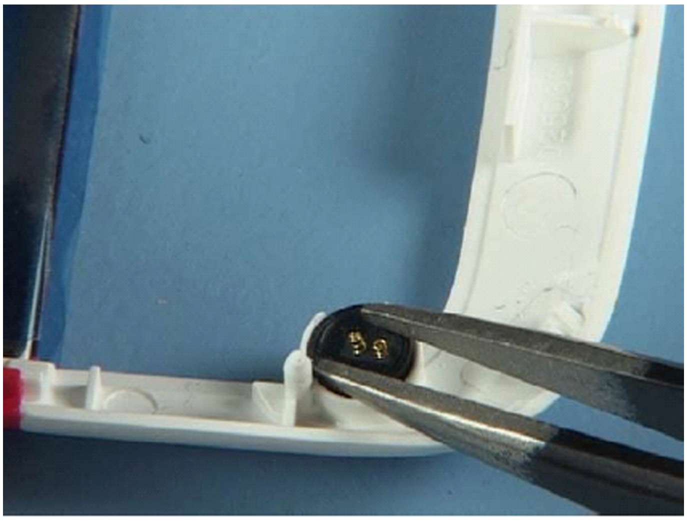
27. Apply the torque to all screws in the order shown.



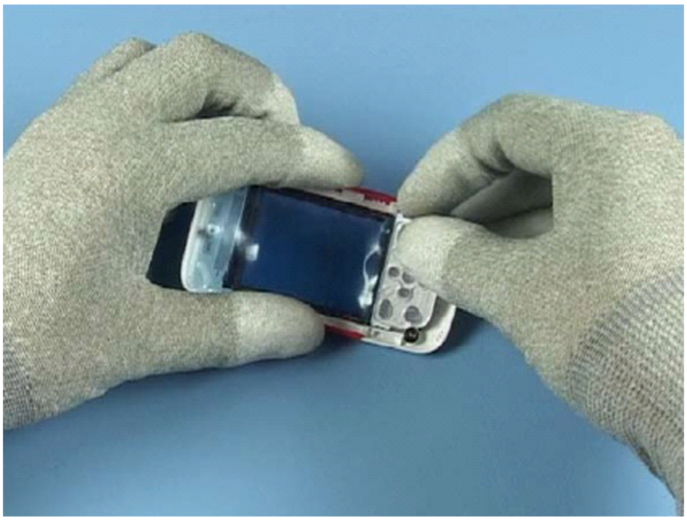
28. Insert the MICROPHONE.



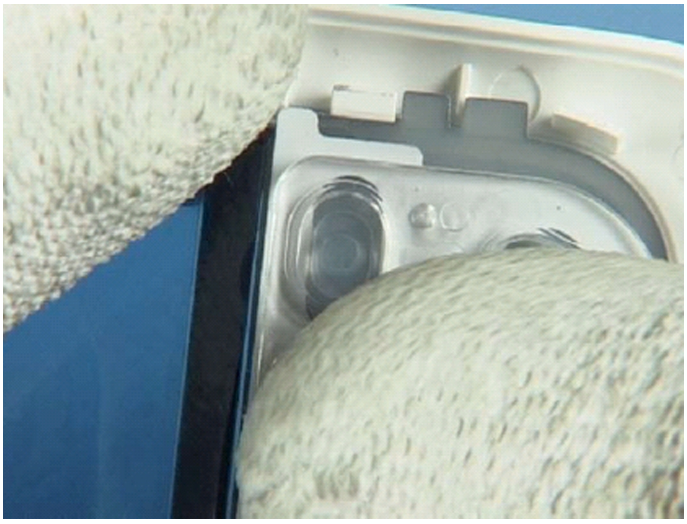
29. Note that the spring contacts are very delicate and can be bent easily.



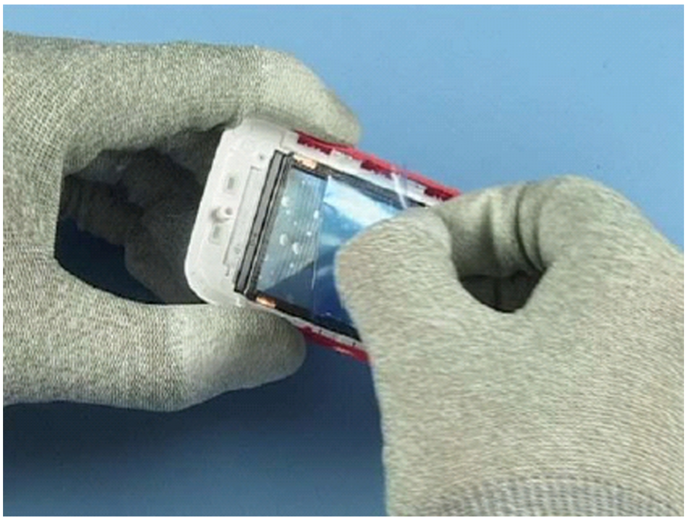
30. Fit the FUNCTIONAL KEYMAT.



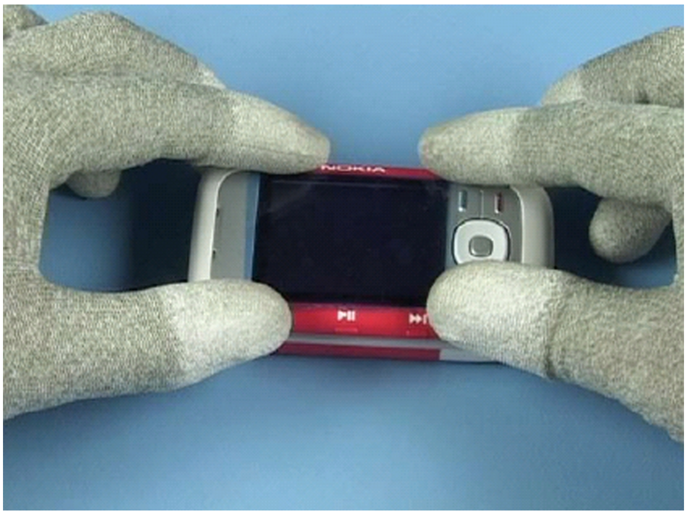
31. Click the snaps into their places.



32. Do not forget removing the protective film before continue.



33. Align the A-COVER assembly and push it down evenly. Click all snaps into their places.

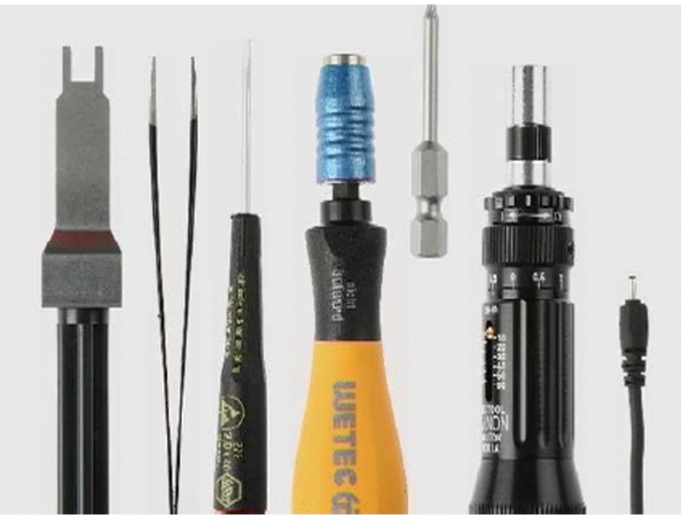


34. Check the window for cleanness.

Lower block disassembly instruction

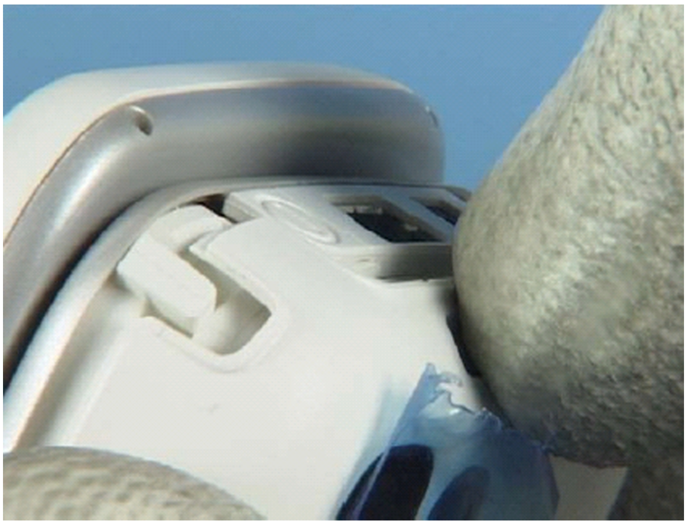
Steps

1. Needed tools: The SS-45 & SS-88 camera removal tool, metal tweezers, a straight bladed screwdriver, a bitholder with a Torx plus size 6 bit, a torque driver, and a DC plug.

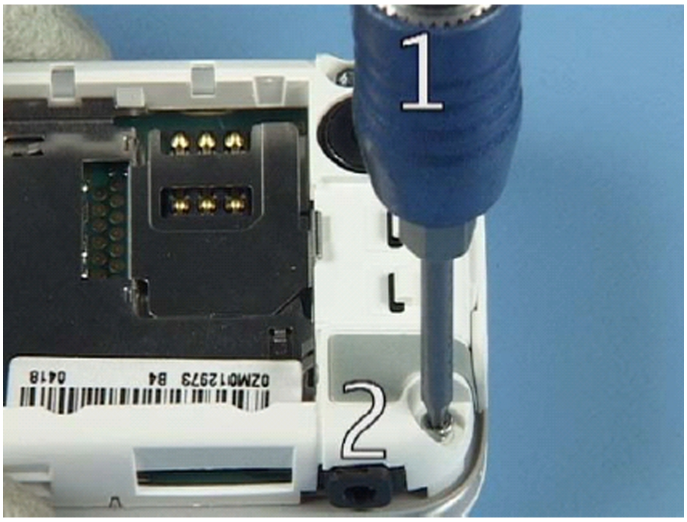


2. Always cover the windows with a protective film.

3. Unlock and remove the E-COVER. Remove the battery if it is still inserted.

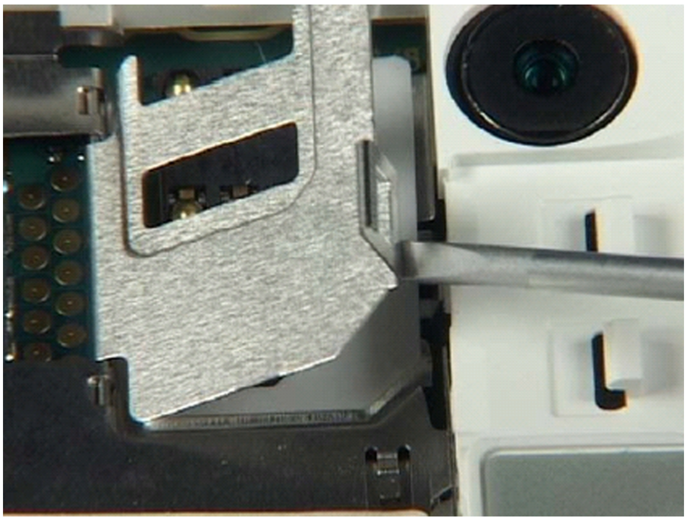


4. Unscrew the torx plus size 6 screws in the order shown.

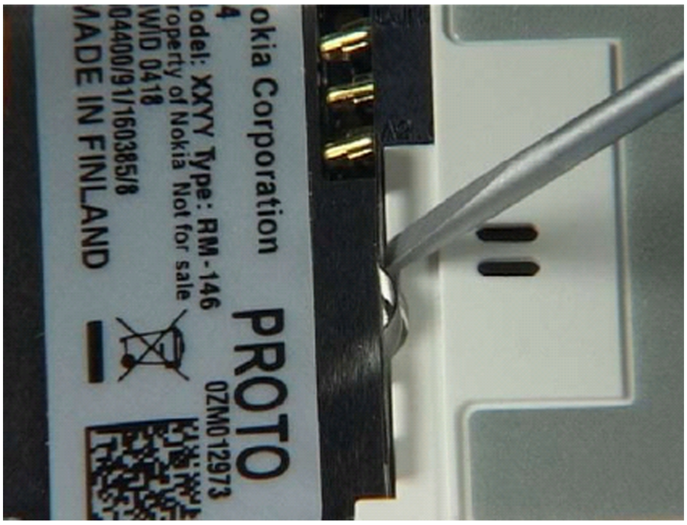


5. Remove all screws and discard them. Do not use them again.

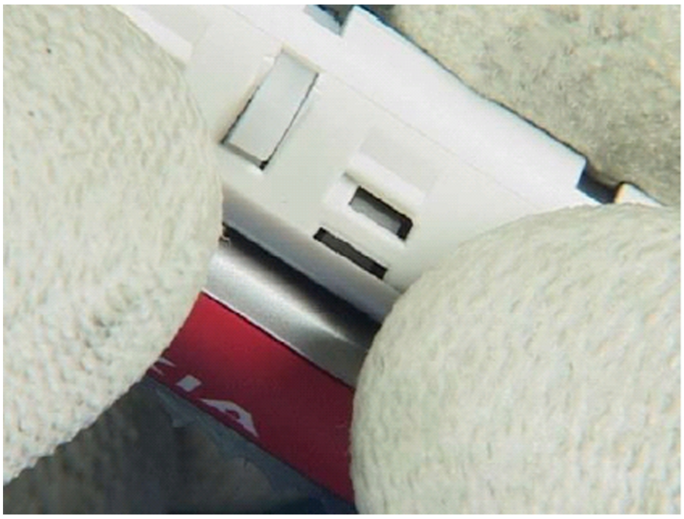
6. Before removing the LABEL COVER, open the SIM flip first...



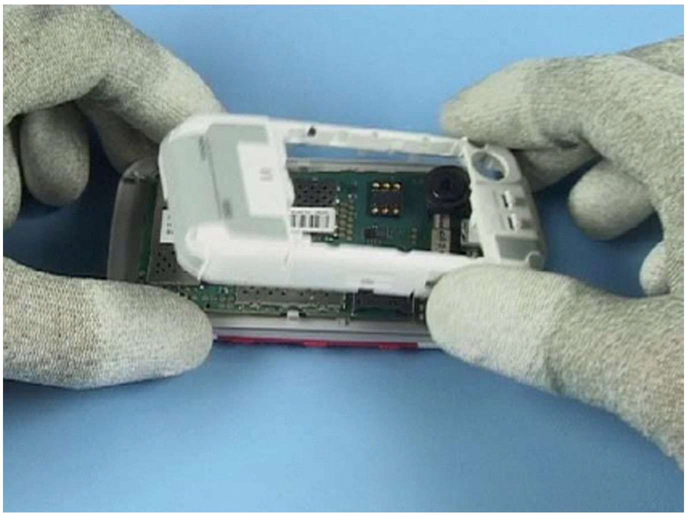
7. ...then lever out the whole LABEL COVER. Never mismatch this part with other engine modules.


Nokia Corporation
Model: XXYY Type: RM-146
Property of Nokia Not for sale
HWID 0418
0440D/91/160385/8
MADE IN FINLAND
PROTO
0ZM012973

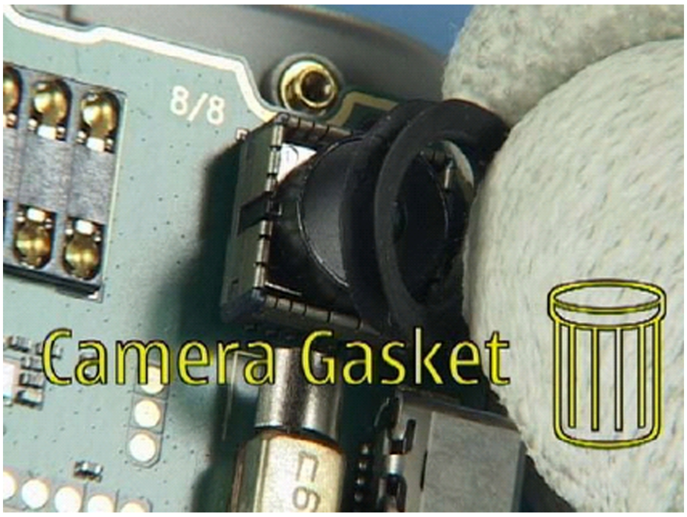
8. Carefully unlock the latches of the C-COVER on both sides. Do not bent the Shielding Lids.



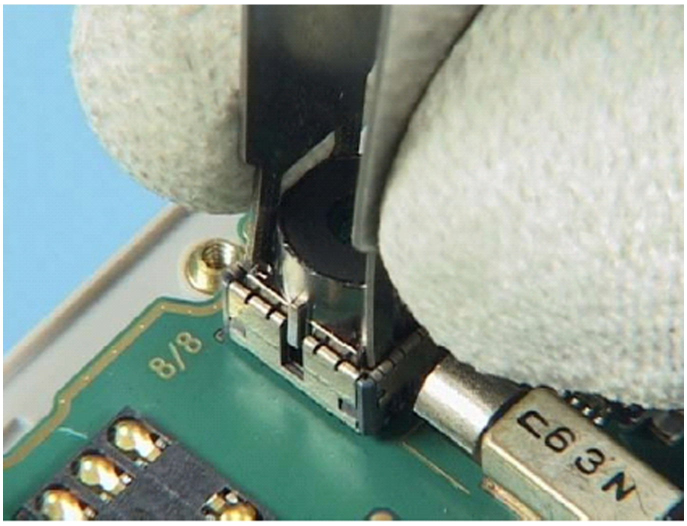
9. Shift the C-COVER in direction shown and remove it.



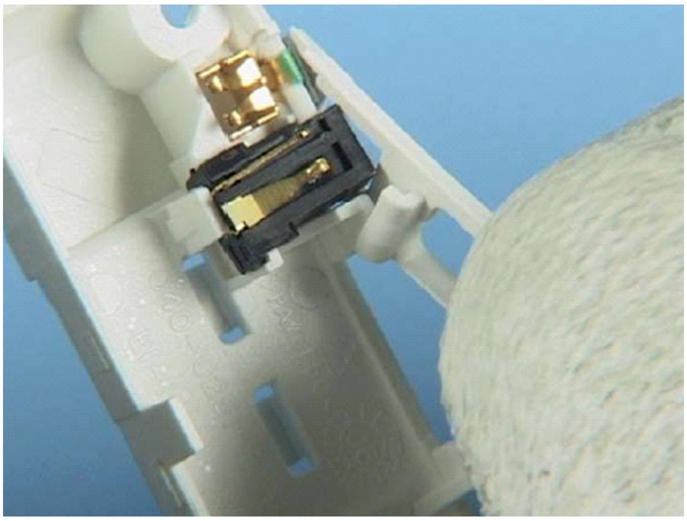
10. Do not touch the lens of the CAMERA while removing the CAMERA GASKET.



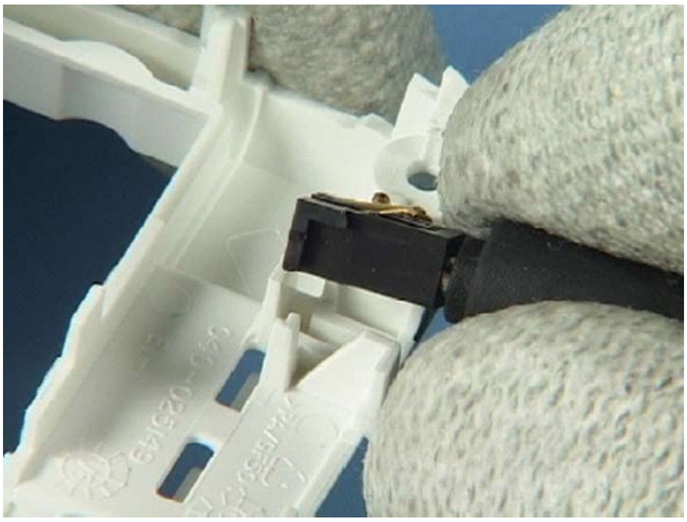
11. Use the SS-45 Camera removal tool to unlock the clips of the housing of the CAMERA. Use the SS-88 for the smaller CAMERA of the 5200.



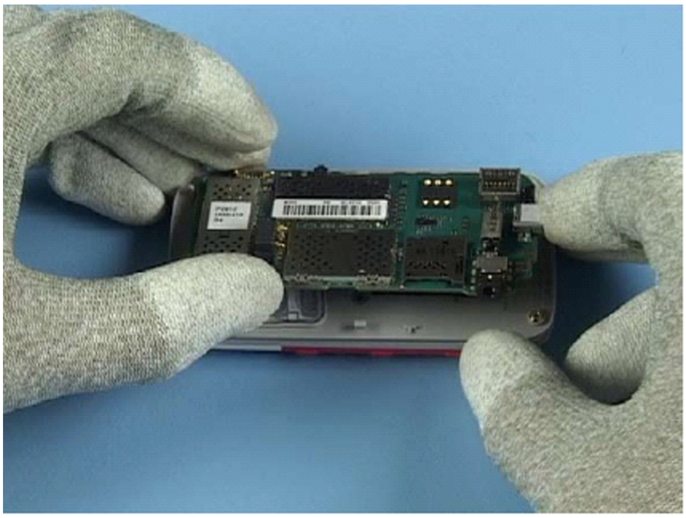
12. Carefully release the POWER KEY.



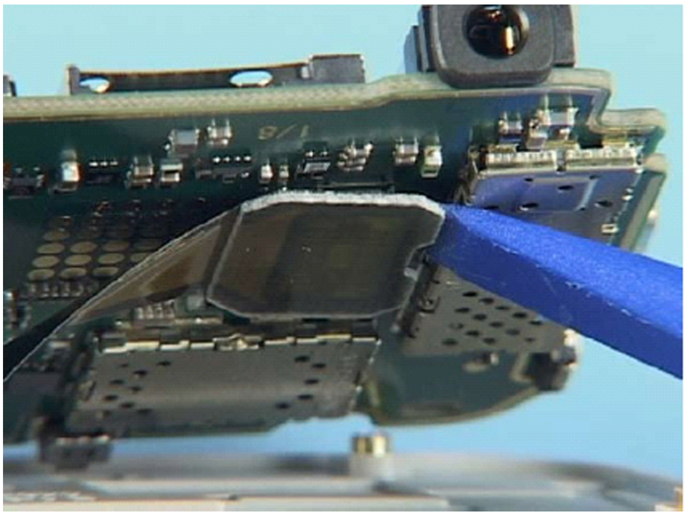
13. Lever out the DC JACK with the DC Plug.



14. Lift up the ENGINE MODULE, but bear in mind that the flex connector is still connected.

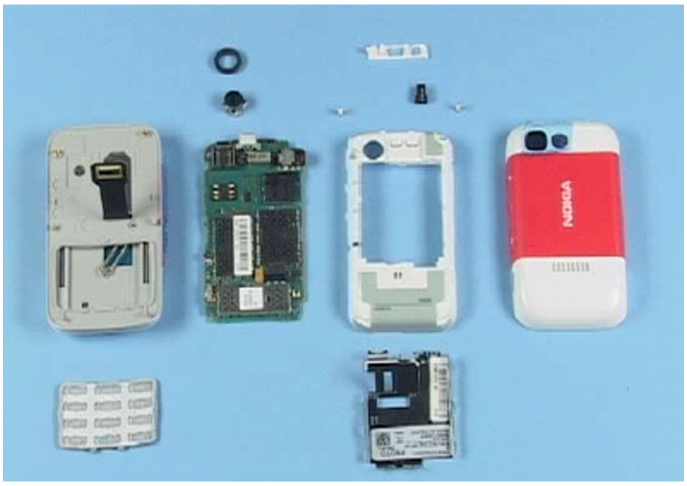


15. Carefully lever open the Flex connector.



16. Remove the NUMERIC KEYMAT.

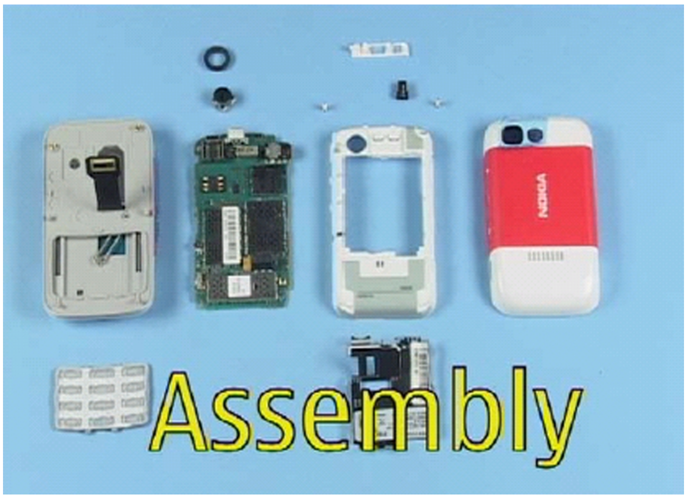
17. The disassembly procedure is now completed.



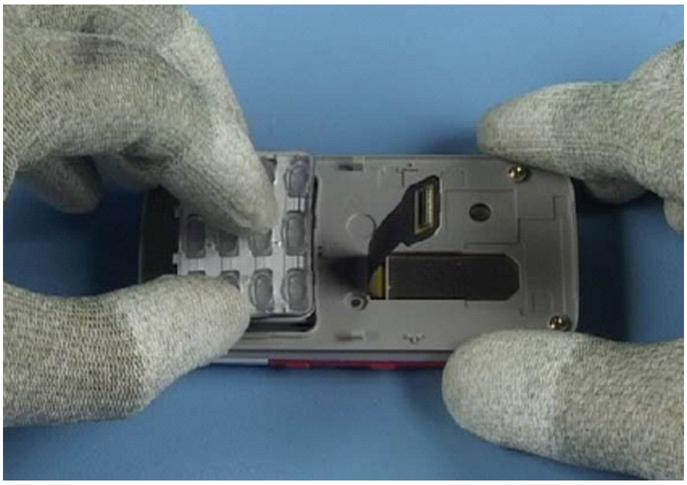
Lower block reassembly instruction

Steps

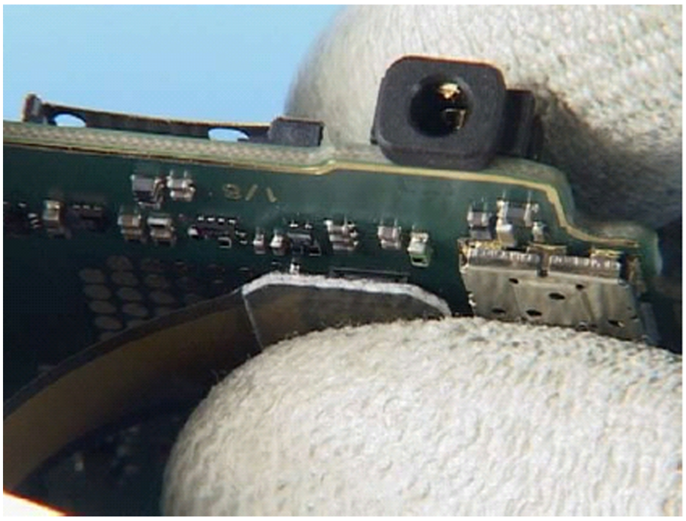
1. Assembly



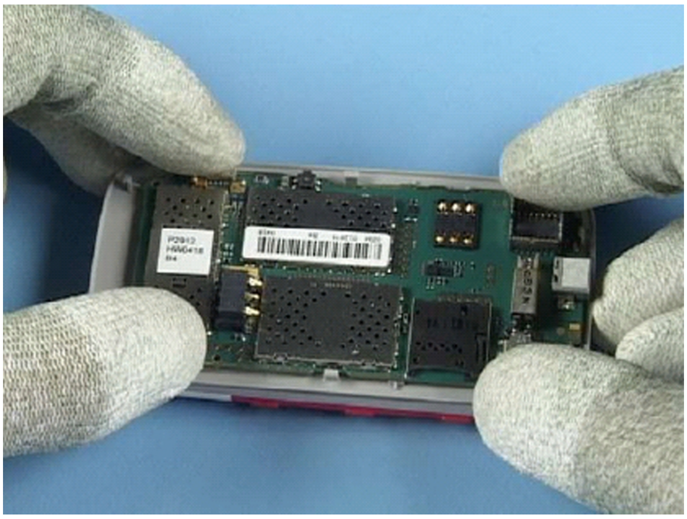
2. Insert the NUMERIC KEYMAT.



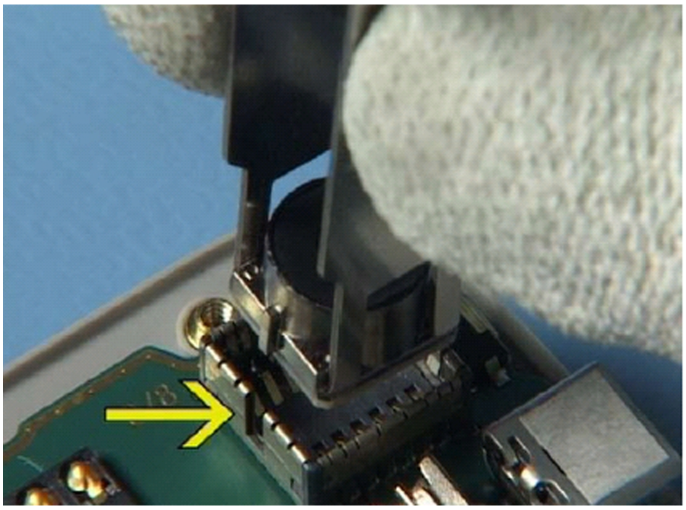
3. Connect the flex foil.



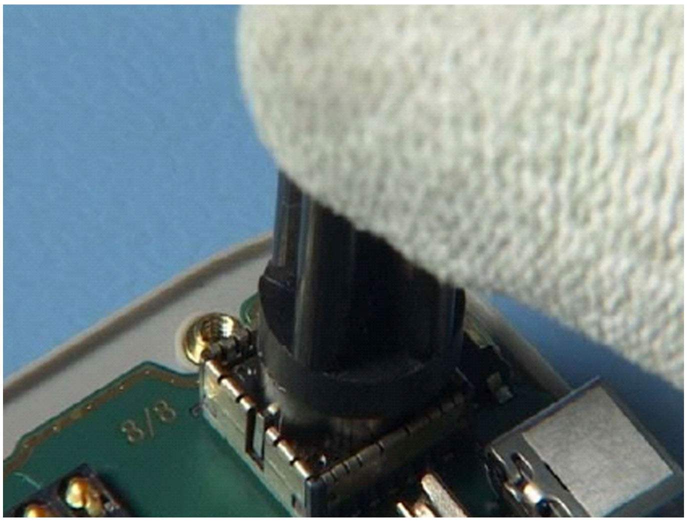
4. Position the ENGINE MODULE correctly.



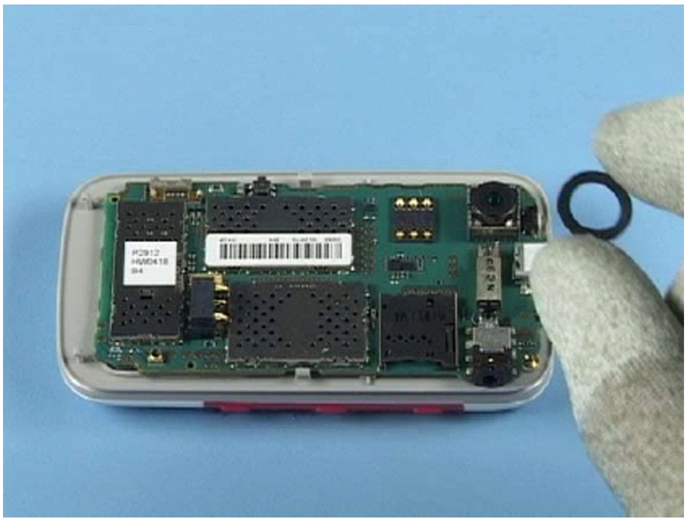
5. Insert the CAMERA. Mind the correct positioning. Use the SS- 88 for the smaller camera of the 5200.



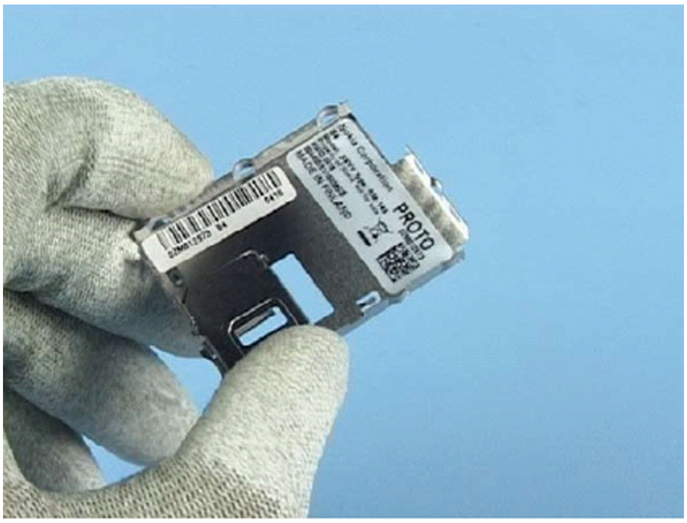
6. Carefully push it into its place.



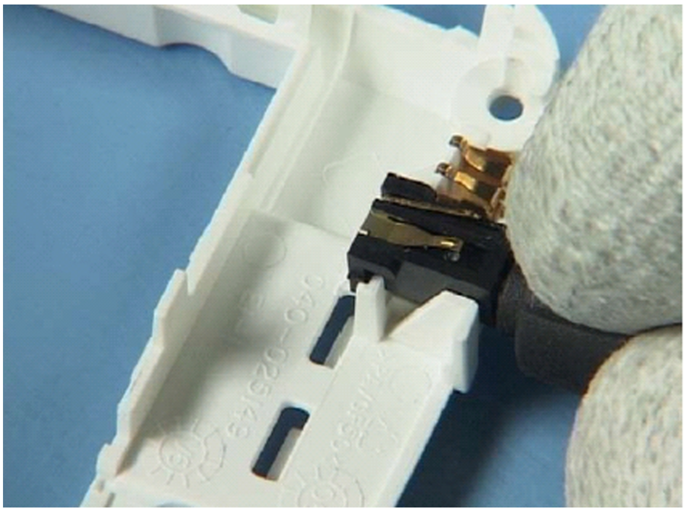
7. Place the CAMERA GASKET.



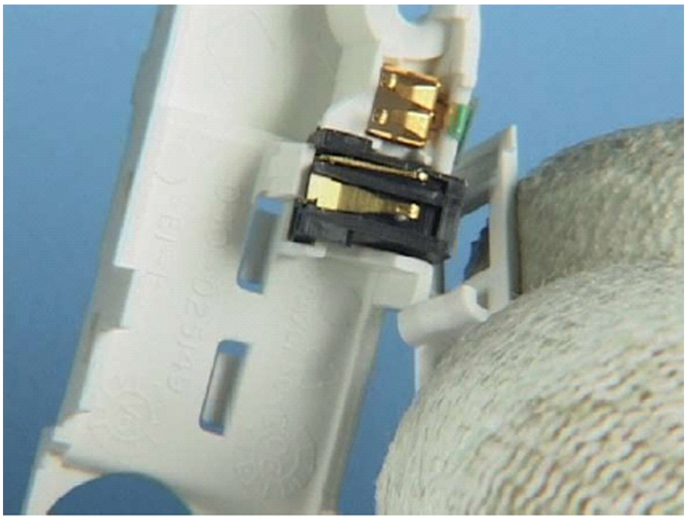
8. When replacing the D-COVER assembly, the delivered LABEL COVER must be replaced with the original labeled one. Never deliver a Product without its Type Label.



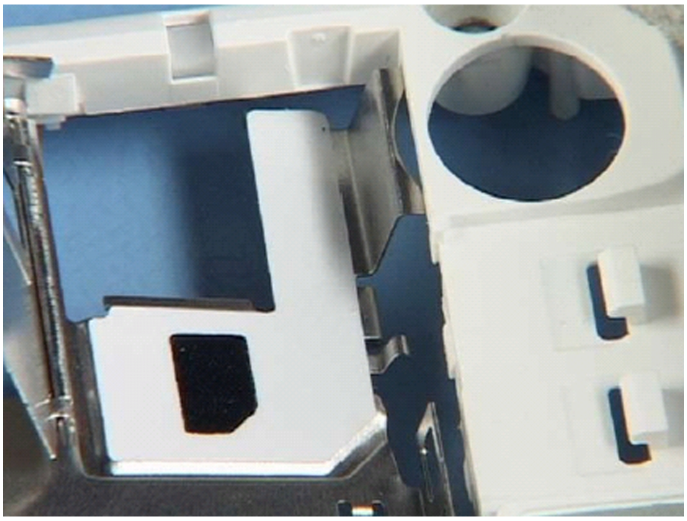
9. Insert the DC JACK with the DC Plug.



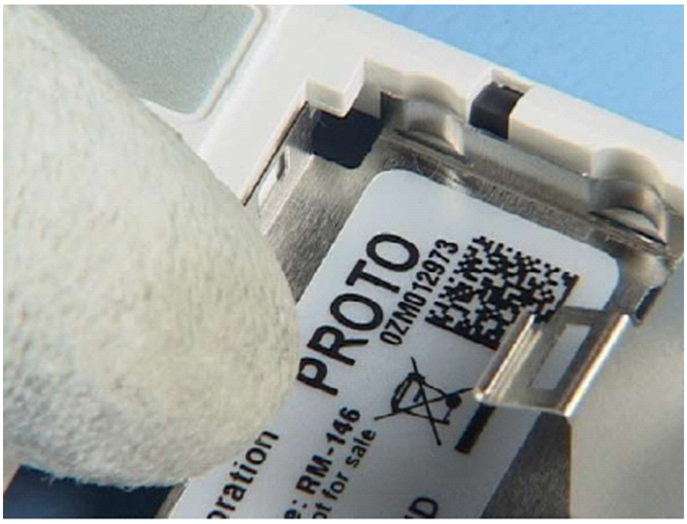
10. Place the POWER KEY, mind the correct placement.



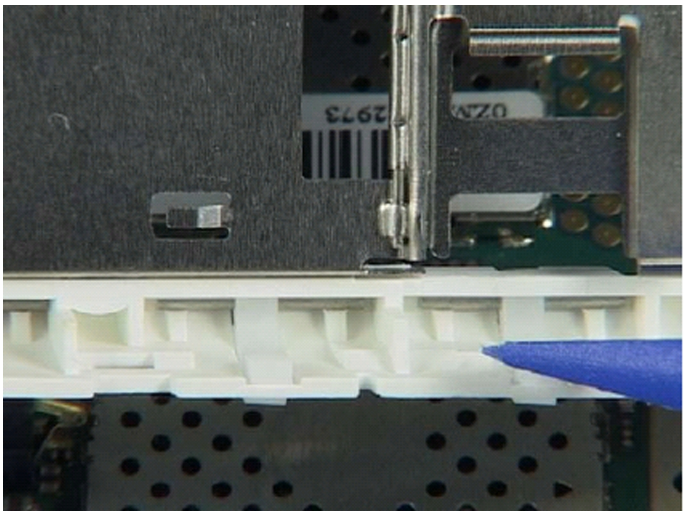
11. Insert the LABEL COVER, fitted with the original TYPE LABEL.



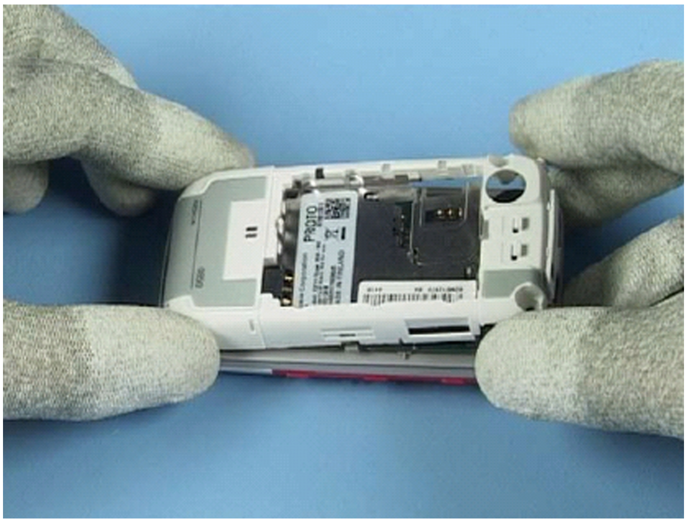
12. Click all snaps into their places.



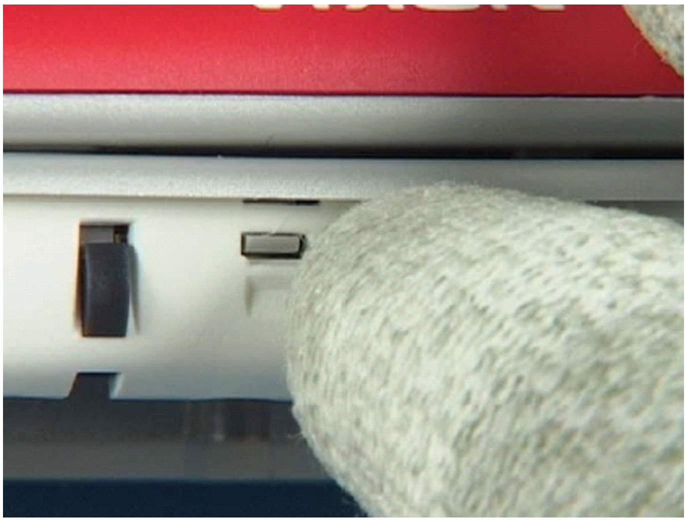
13. Before continue,- bring all sidekey levers into the position shown.



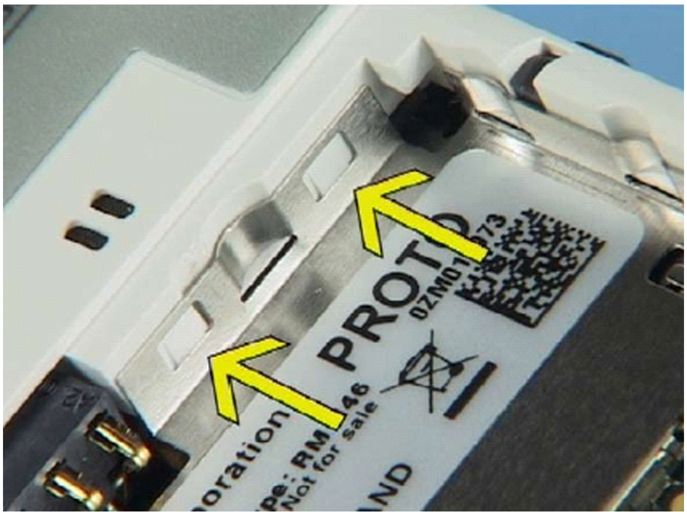
14. Place the assemblies together, click the snaps into their places.



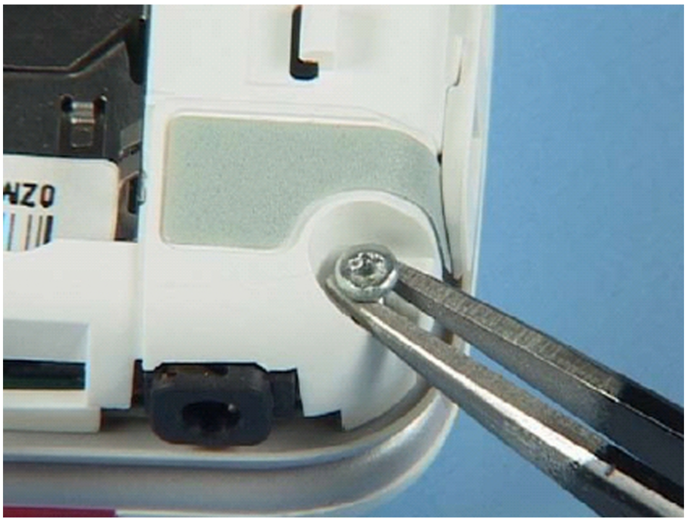
15. Check the functionality of all keys before going on.



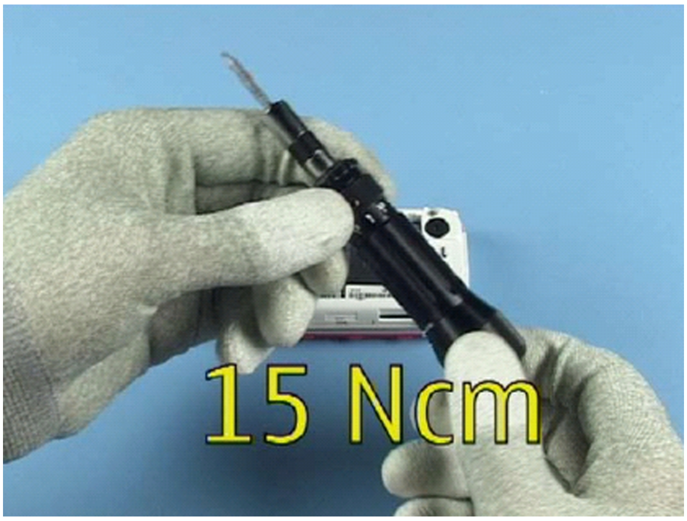
16. Mind the correct positioning of this metal clips.



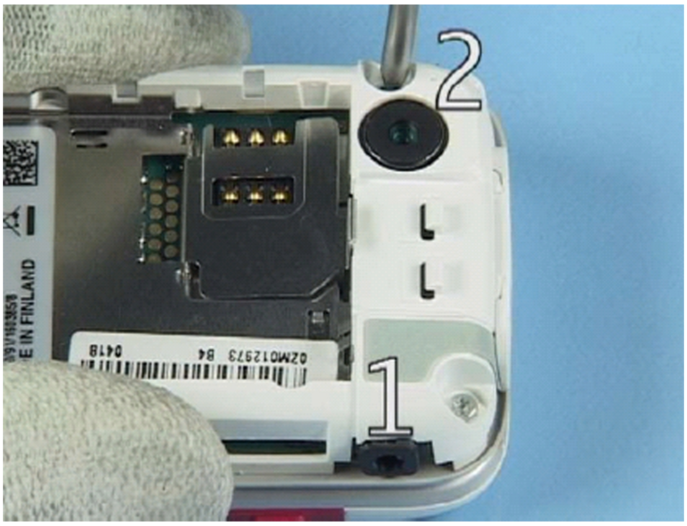
17. Insert the screws.



18. Set the correct torque.



19. Apply the torque to all screws in the order shown.



20. Complete the assembly with the B-COVER.

21. At least check the functionality of the slide mechanism.

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6 — BB Troubleshooting and Manual Tuning Guide

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Baseband troubleshooting overview

This section is intended to be a guide for localising and repairing electrical faults.

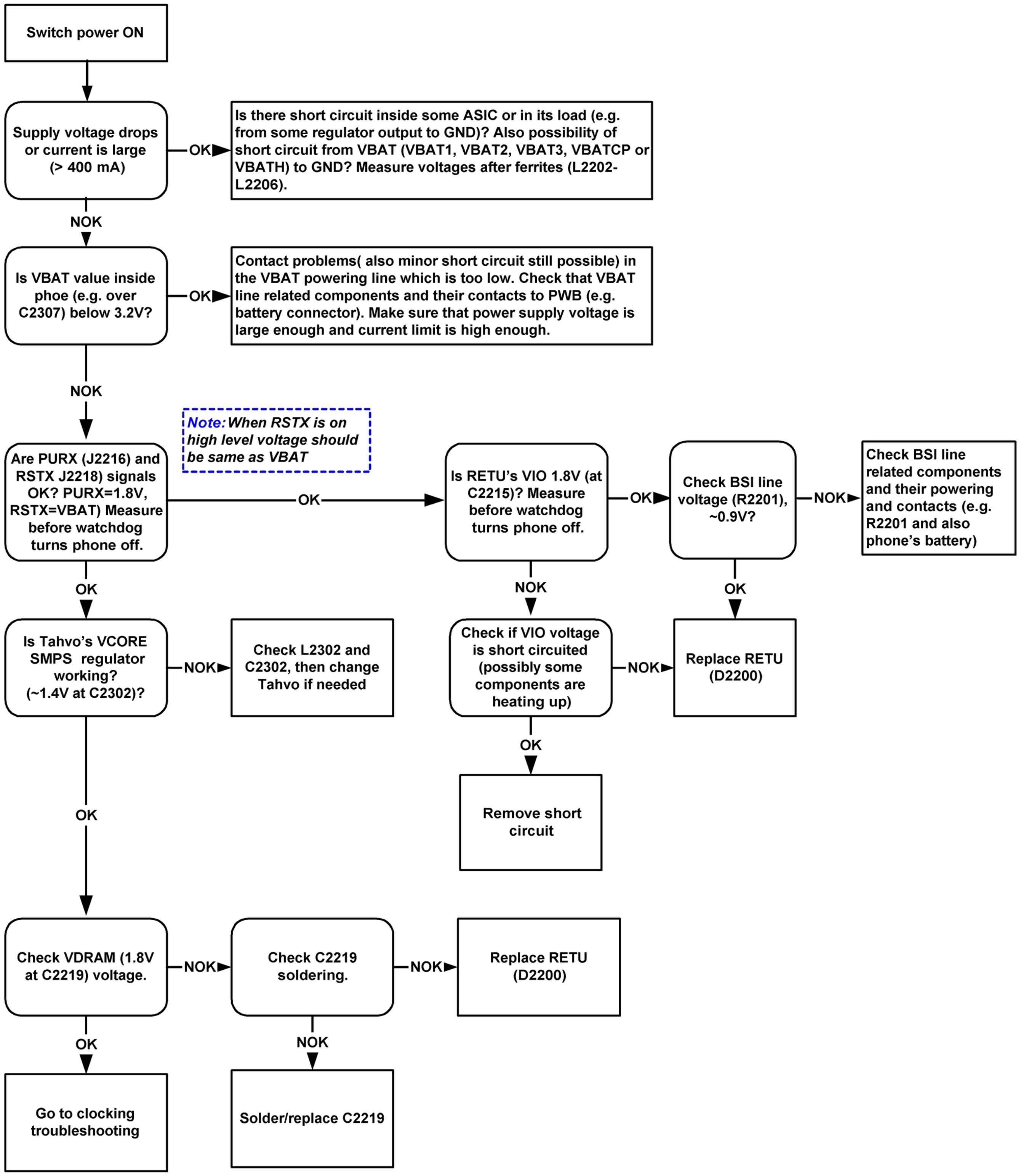
The table below tells you what troubleshooting to go to.

Problem	Troubleshooting
Abnormal current consumption	1 General power checking (page 6–6) 2 Battery current measuring fault (page 6–7)
Flashing does not work or the problem is not clearly defined	1 Flashing (page 6–16) 2 Clocking (page 6–9) 3 Combo memory (page 6–15)
Charging does not work	Charging (page 6–8)
Display does not work	Display fault (page)
Backlights do not work	1 Backlight (page 6–23) 2 LED driver (page 6–8)
USB does not work	USB (page 6–44)
Audio (mic, earpiece, IHF) does not work	1 Audio (page 6–26) 2 Acoustics (page)
Camera does not work	1 Camera hardware failure message (page) 2 Camera baseband hardware (page 6–11) 3 Camera viewfinder (page 6–13) 4 Bad image quality (page 6–14)
Slide switch/Hall sensor detection	Hall sensor (page 6–25)
Bluetooth does not work	Bluetooth (BT) (page 6–37)
FM radio does not work	FM radio (page 6–17)
Infrared communication (IrDa)	IrDa (page)
µSD MMC card	SD card (page 6–19)

Power and charging troubleshooting

General power checking troubleshooting

Troubleshooting flow



Switch power ON

Supply voltage drops or current is large (> 400 mA)

Is there short circuit inside some ASIC or in its load (e.g. from some regulator output to GND)? Also possibility of short circuit from VBAT (VBAT1, VBAT2, VBAT3, VBATCP or VBATH) to GND? Measure voltages after ferrites (L2202-L2206).

Is VBAT value inside phoe (e.g. over C2307) below 3.2V?

Contact problems(also minor short circuit still possible) in the VBAT powering line which is too low. Check that VBAT line related components and their contacts to PWB (e.g. battery connector). Make sure that power supply voltage is large enough and current limit is high enough.

Note: When RSTX is on high level voltage should be same as VBAT

Are PURX (J2216) and RSTX J2218) signals OK? PURX=1.8V, RSTX=VBAT) Measure before watchdog turns phone off.

Is RETU's VIO 1.8V (at C2215)? Measure before watchdog turns phone off.

Check BSI line voltage (R2201), ~0.9V?

Check BSI line related components and their powering and contacts (e.g. R2201 and also phone's battery)

Is Tahvo's VCORE SMPS regulator working? (~1.4V at C2302)?

Check L2302 and C2302, then change Tahvo if needed

Check if VIO voltage is short circuited (possibly some components are heating up)

Replace RETU (D2200)

Remove short circuit

Check VDRAM (1.8V at C2219) voltage.

Check C2219 soldering.

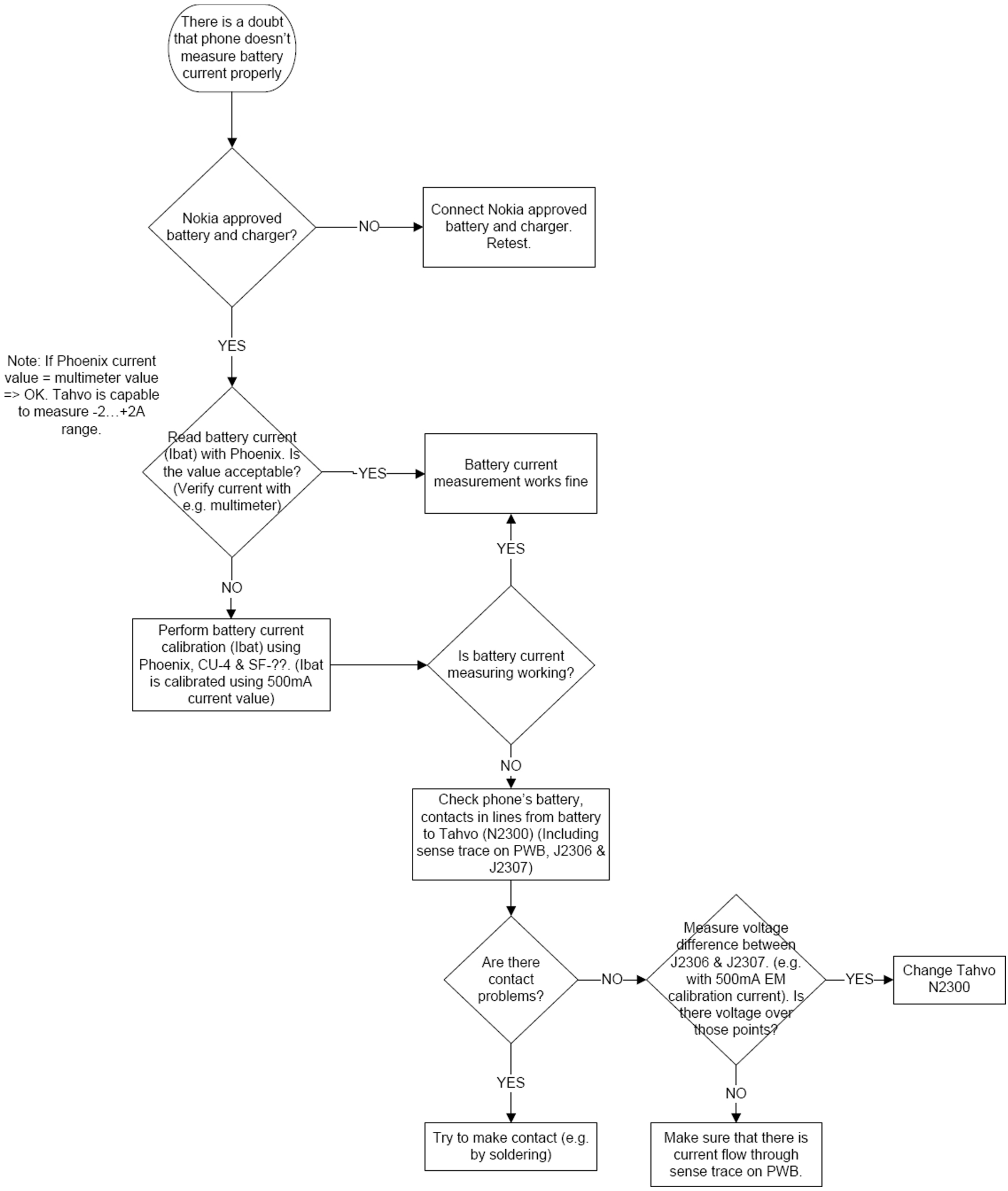
Replace RETU (D2200)

Go to clocking troubleshooting

Solder/replace C2219

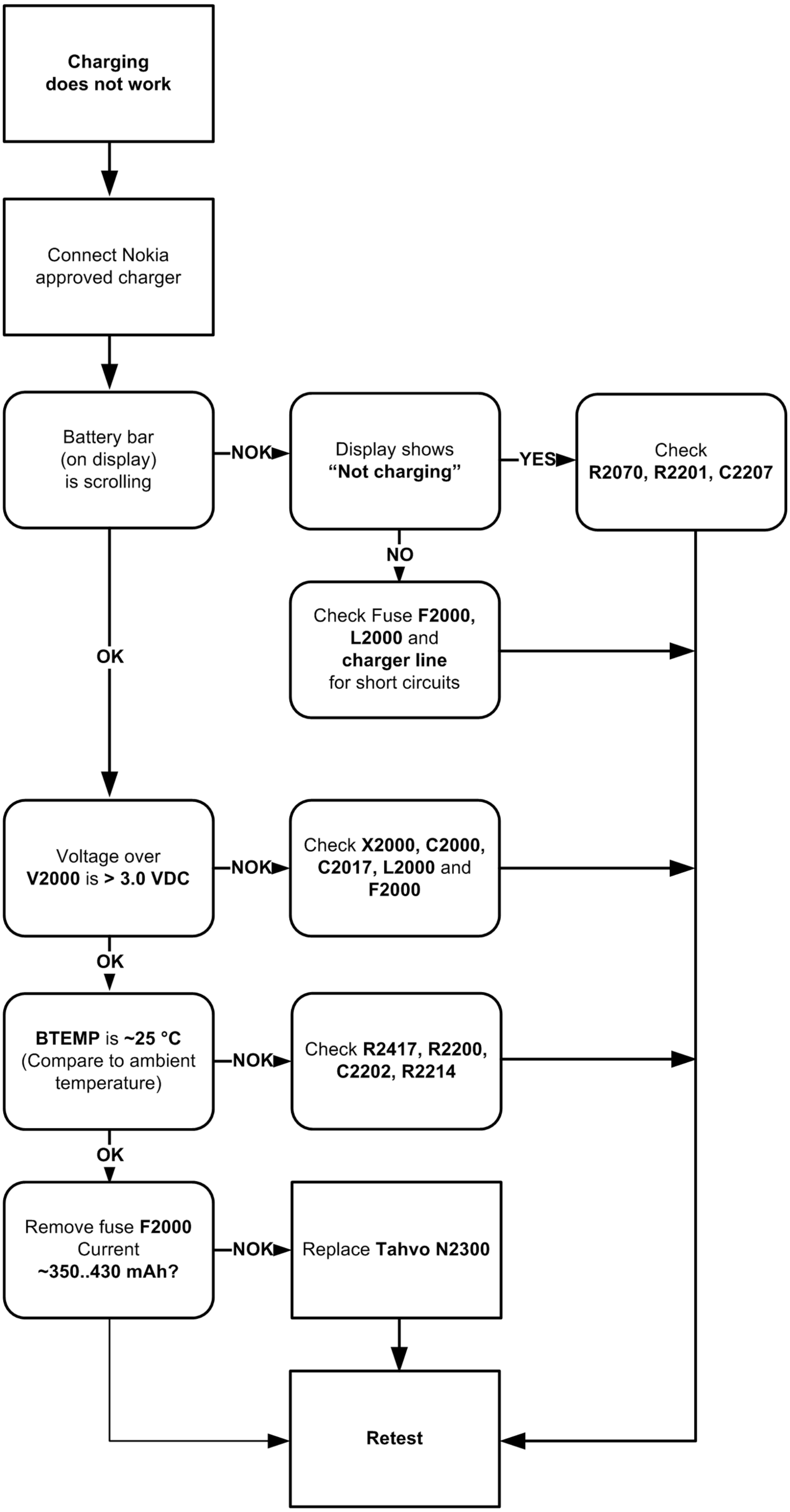
Battery current measuring fault troubleshooting

Troubleshooting flow


There is a doubt that phone doesn't measure battery current properly
Nokia approved battery and charger?
NO
Connect Nokia approved battery and charger. Retest.
YES
Note: If Phoenix current value = multimeter value => OK. Tahvo is capable to measure -2…+2A range.
Read battery current (Ibat) with Phoenix. Is the value acceptable? (Verify current with e.g. multimeter)
YES
Battery current measurement works fine
NO
Perform battery current calibration (Ibat) using Phoenix, CU-4 & SF-??. (Ibat is calibrated using 500mA current value)
YES
Is battery current measuring working?
NO
Check phone's battery, contacts in lines from battery to Tahvo (N2300) (Including sense trace on PWB, J2306 & J2307)
Are there contact problems?
NO
Measure voltage difference between J2306 & J2307. (e.g. with 500mA EM calibration current). Is there voltage over those points?
YES
Change Tahvo N2300
YES
Try to make contact (e.g. by soldering)
NO
Make sure that there is current flow through sense trace on PWB.

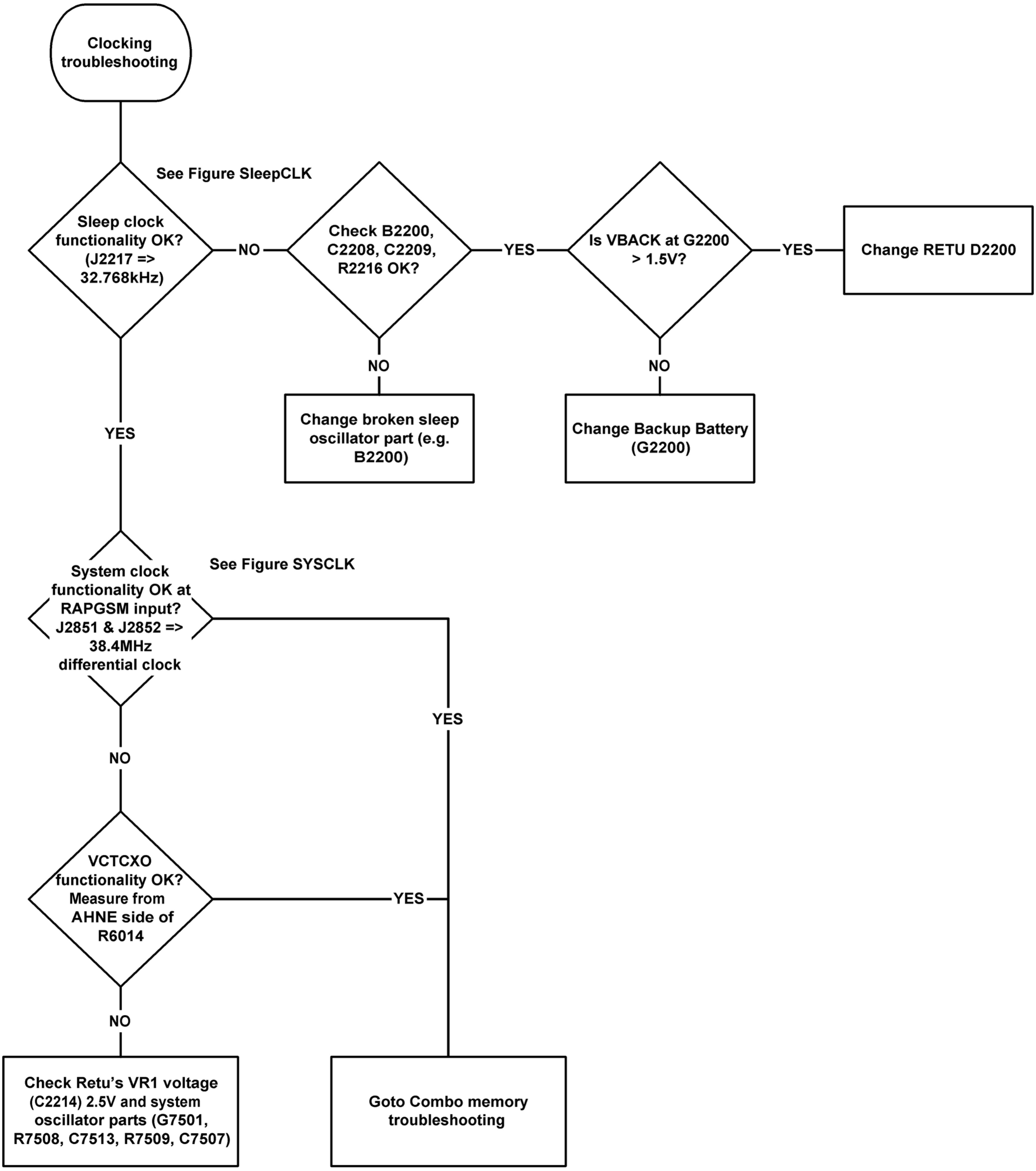
Charging troubleshooting

Troubleshooting flow


Charging does not work
Connect Nokia approved charger
Battery bar (on display) is scrolling
NOK
Display shows “Not charging”
YES
Check R2070, R2201, C2207
NO
Check Fuse F2000, L2000 and charger line for short circuits
OK
Voltage over V2000 is > 3.0 VDC
NOK
Check X2000, C2000, C2017, L2000 and F2000
OK
BTEMP is ~25 °C (Compare to ambient temperature)
NOK
Check R2417, R2200, C2202, R2214
OK
Remove fuse F2000 Current ~350..430 mAh?
NOK
Replace Tahvo N2300
Retest

Clocking troubleshooting

Troubleshooting flow


Clocking troubleshooting
See Figure SleepCLK
Sleep clock functionality OK? (J2217 => 32.768kHz)
NO
Check B2200, C2208, C2209, R2216 OK?
YES
Is VBACK at G2200 > 1.5V?
YES
Change RETU D2200
NO
Change broken sleep oscillator part (e.g. B2200)
NO
Change Backup Battery (G2200)
YES
See Figure SYSCLK
System clock functionality OK at RAPGSM input? J2851 & J2852 => 38.4MHz differential clock
YES
NO
VCTCXO functionality OK? Measure from AHNE side of R6014
YES
NO
Check Retu's VR1 voltage (C2214) 2.5V and system oscillator parts (G7501, R7508, C7513, R7509, C7507)
Goto Combo memory troubleshooting

Interface troubleshooting

Camera failure

Introduction to camera troubleshooting

Bad conditions often cause bad pictures. Therefore, the camera operation has to be checked in constant conditions or by using a second, known-to-be-good Nokia device as reference. Image quality is hard to measure quantitatively, and the difference between a good and a bad picture can be small. Some training or experience may be needed to detect what is actually wrong.

When checking for possible errors in camera functionality, knowing what error is suspected significantly helps the testing by narrowing down the amount of test cases. The following types of image quality problems are common:

- Dust (black spots)
- Lack of sharpness
- Bit errors

Taking and evaluating test pictures

When *taking* a test picture, remember the following:

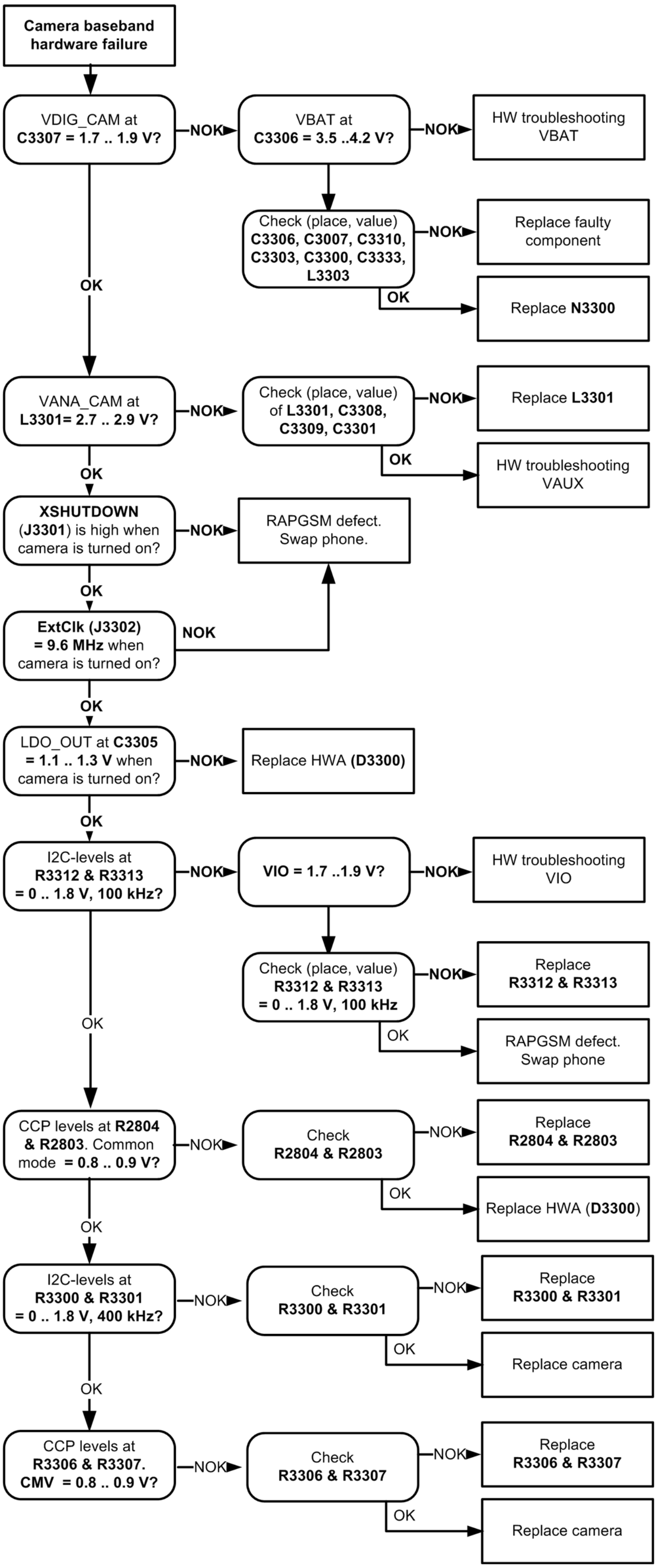
- Avoid bright fluorescent light, 50/60Hz electrical network or high artificial illumination levels
- If the phone is hot, let it rest for a while before taking the picture
- Make sure the optical system is clean
- Use highest possible resolution
- Make sure the light is suffiecient (bright office lightning)
- Do not take the picture towards light source
- Be as still as possible when taking the picture
- Distance should be at least 40cm, 1-2m is recommended

When *evaluating* a test picture, remember the following:

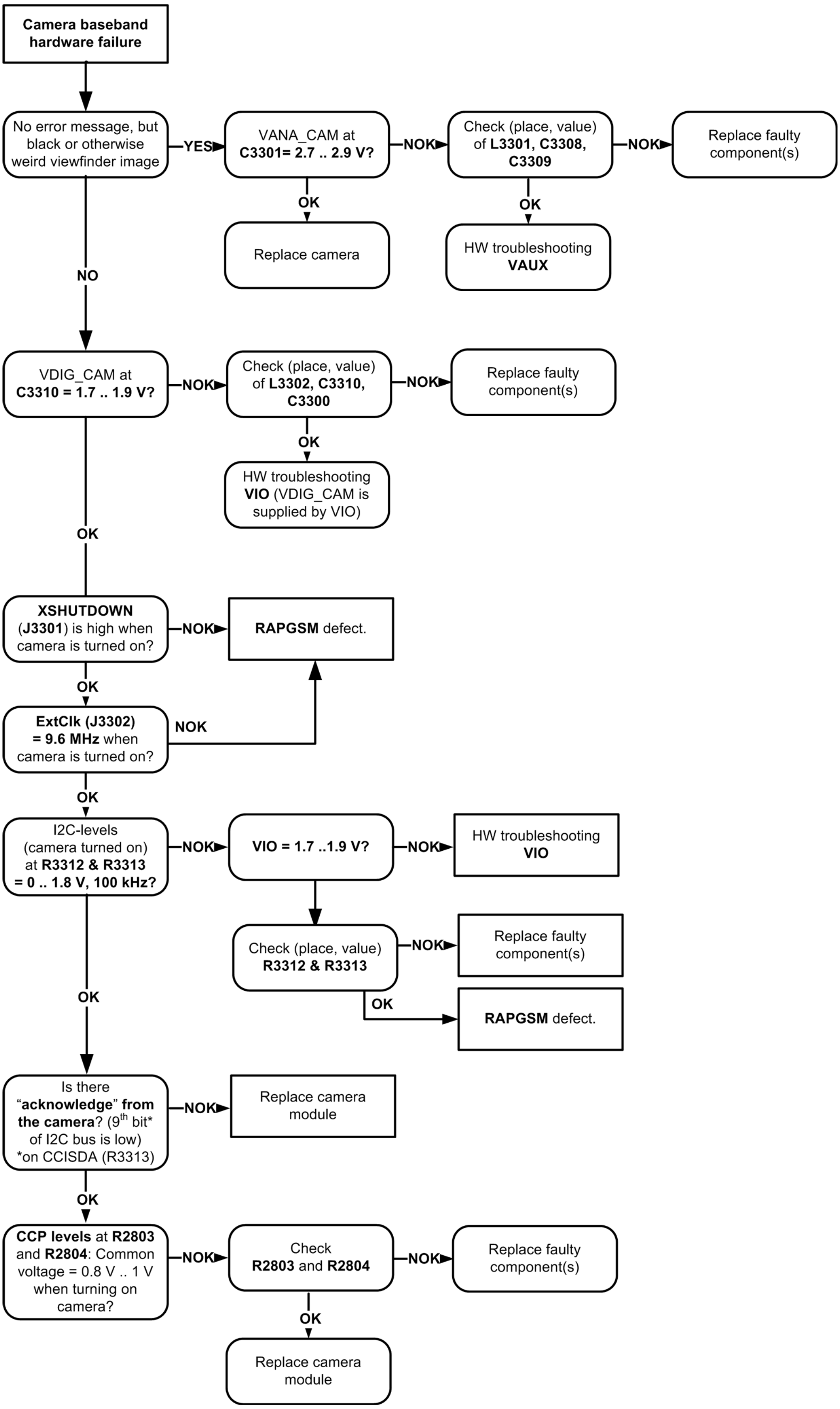
- The center of the picture is sharper than the edges
- The image may be blurred, though it does not show in the viewfinder
- Analyse the picture from your PC monitor, full colour setting is recommended
- If possible, compare with a picture of the same motive taken with a similar Nokia device

Camera hardware troubleshooting

RM-146/147 Camera hardware troubleshooting

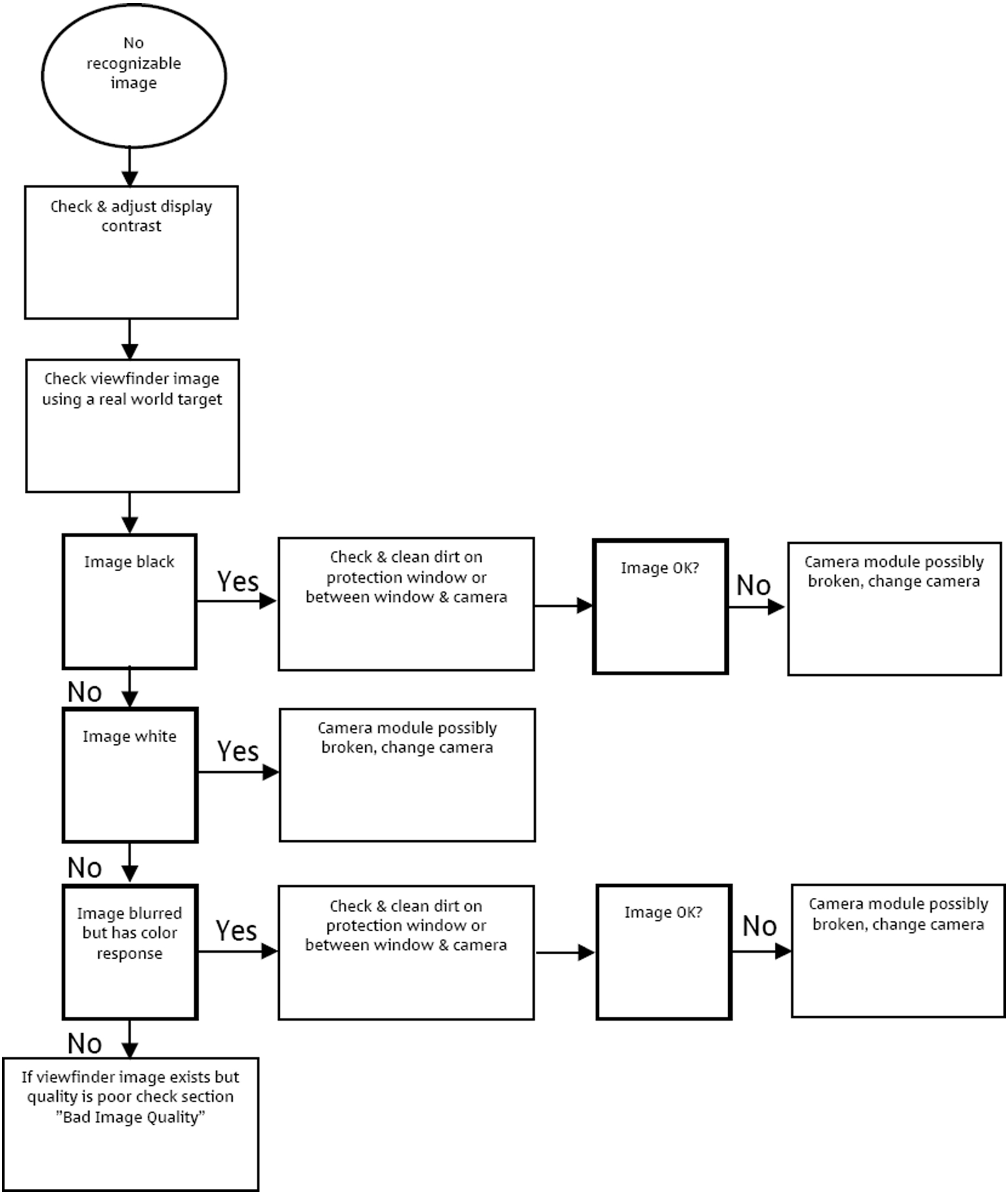

Camera baseband hardware failure
VDIG_CAM at C3307 = 1.7 .. 1.9 V?
NOK
VBAT at C3306 = 3.5 ..4.2 V?
NOK
HW troubleshooting VBAT
Check (place, value) C3306, C3007, C3310, C3303, C3300, C3333, L3303
NOK
Replace faulty component
OK
Replace N3300
OK
VANA_CAM at L3301= 2.7 .. 2.9 V?
NOK
Check (place, value) of L3301, C3308, C3309, C3301
NOK
Replace L3301
OK
HW troubleshooting VAUX
OK
XSHUTDOWN (J3301) is high when camera is turned on?
NOK
RAPGSM defect. Swap phone.
OK
ExtClk (J3302) = 9.6 MHz when camera is turned on?
NOK
OK
LDO_OUT at C3305 = 1.1 .. 1.3 V when camera is turned on?
NOK
Replace HWA (D3300)
OK
I2C-levels at R3312 & R3313 = 0 .. 1.8 V, 100 kHz?
NOK
VIO = 1.7 ..1.9 V?
NOK
HW troubleshooting VIO
Check (place, value) R3312 & R3313 = 0 .. 1.8 V, 100 kHz
NOK
Replace R3312 & R3313
OK
RAPGSM defect. Swap phone
OK
CCP levels at R2804 & R2803. Common mode = 0.8 .. 0.9 V?
NOK
Check R2804 & R2803
NOK
Replace R2804 & R2803
OK
Replace HWA (D3300)
OK
I2C-levels at R3300 & R3301 = 0 .. 1.8 V, 400 kHz?
NOK
Check R3300 & R3301
NOK
Replace R3300 & R3301
OK
Replace camera
OK
CCP levels at R3306 & R3307. CMV = 0.8 .. 0.9 V?
NOK
Check R3306 & R3307
NOK
Replace R3306 & R3307
OK
Replace camera

RM-174/181 Camera hardware troubleshooting


Camera baseband hardware failure
No error message, but black or otherwise weird viewfinder image
YES
VANA_CAM at C3301= 2.7 .. 2.9 V?
NOK
Check (place, value) of L3301, C3308, C3309
NOK
Replace faulty component(s)
OK
Replace camera
OK
HW troubleshooting VAUX
NO
VDIG_CAM at C3310 = 1.7 .. 1.9 V?
NOK
Check (place, value) of L3302, C3310, C3300
NOK
Replace faulty component(s)
OK
HW troubleshooting VIO (VDIG_CAM is supplied by VIO)
OK
XSHUTDOWN (J3301) is high when camera is turned on?
NOK
RAPGSM defect.
OK
ExtClk (J3302) = 9.6 MHz when camera is turned on?
NOK
OK
I2C-levels (camera turned on) at R3312 & R3313 = 0 .. 1.8 V, 100 kHz?
NOK
VIO = 1.7 ..1.9 V?
NOK
HW troubleshooting VIO
Check (place, value) R3312 & R3313
NOK
Replace faulty component(s)
OK
RAPGSM defect.
OK
Is there “acknowledge” from the camera? (9th bit* of I2C bus is low) *on CCISDA (R3313)
NOK
Replace camera module
OK
CCP levels at R2803 and R2804: Common voltage = 0.8 V .. 1 V when turning on camera?
NOK
Check R2803 and R2804
NOK
Replace faulty component(s)
OK
Replace camera module

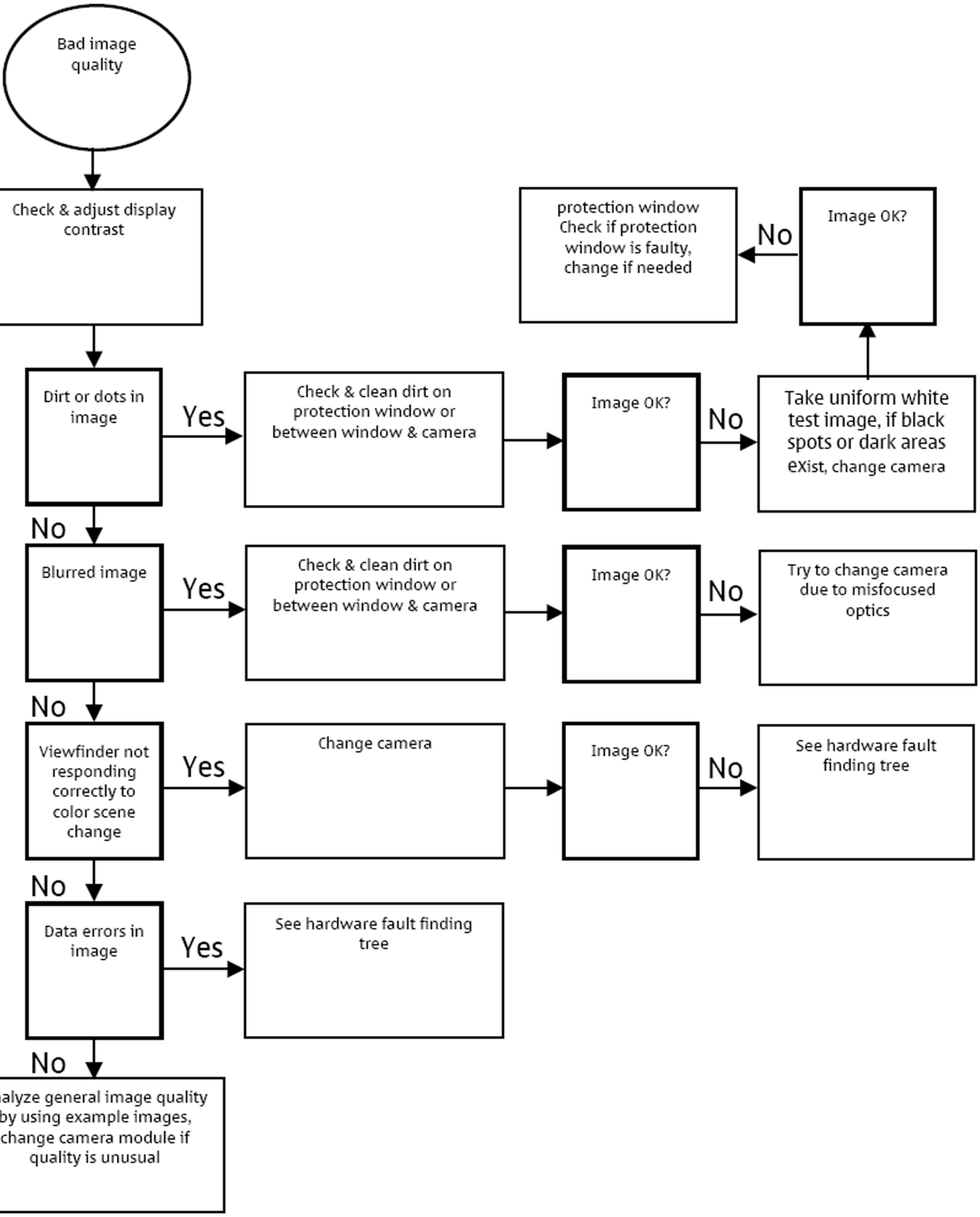
Camera viewfinder troubleshooting

Troubleshooting flow


No recognizable image
Check & adjust display contrast
Check viewfinder image using a real world target
Image black
Yes
Check & clean dirt on protection window or between window & camera
Image OK?
No
Camera module possibly broken, change camera
No
Image white
Yes
Camera module possibly broken, change camera
No
Image blurred but has color response
Yes
Check & clean dirt on protection window or between window & camera
Image OK?
No
Camera module possibly broken, change camera
No
If viewfinder image exists but quality is poor check section "Bad Image Quality"

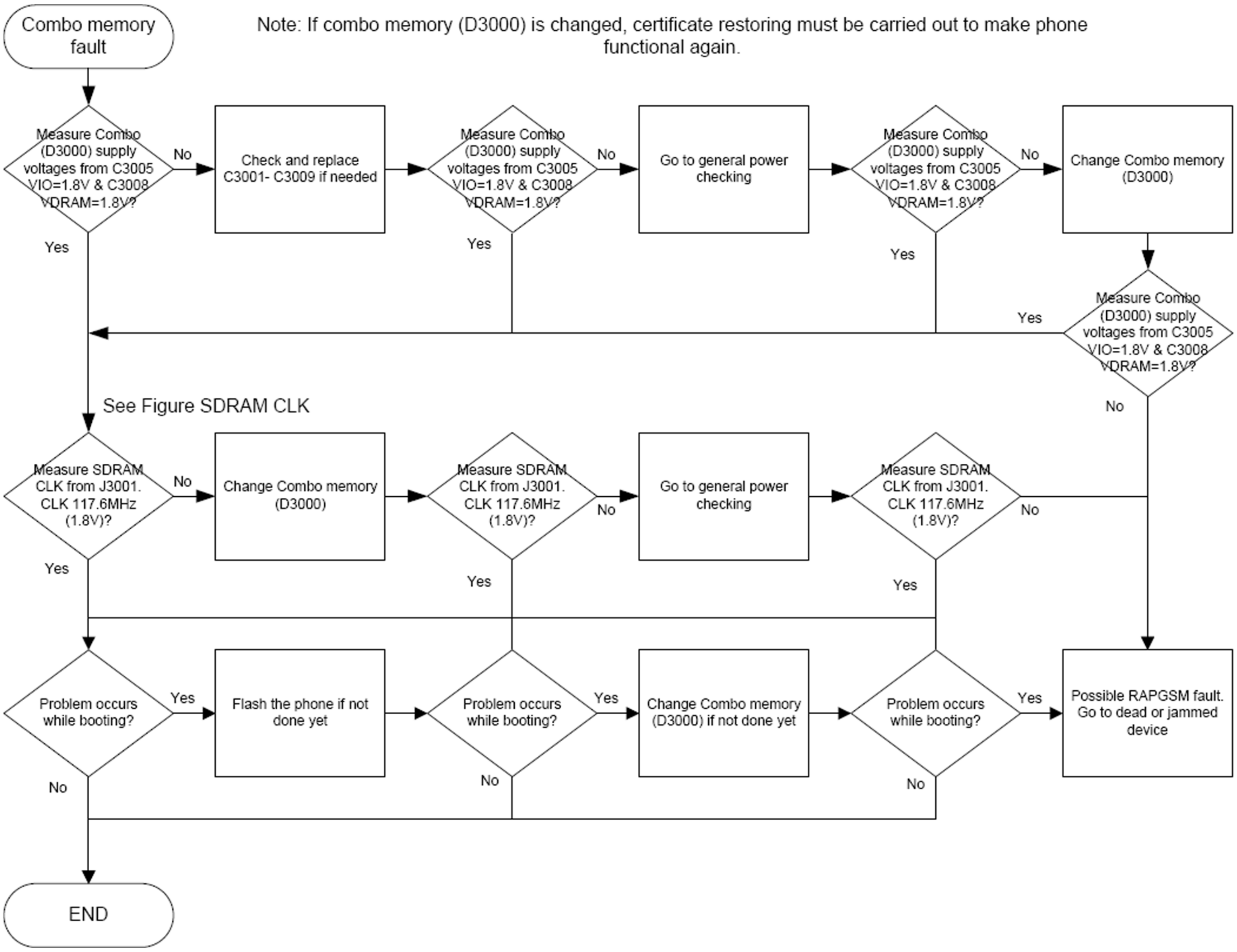
Camera: Bad image quality troubleshooting

Troubleshooting flow


Bad image quality
Check & adjust display contrast
Dirt or dots in image
Yes
Check & clean dirt on protection window or between window & camera
Image OK?
No
Take uniform white test image, if black spots or dark areas exist, change camera
Image OK?
No
protection window Check if protection window is faulty, change if needed
No
Blurred image
Yes
Check & clean dirt on protection window or between window & camera
Image OK?
No
Try to change camera due to misfocused optics
No
Viewfinder not responding correctly to color scene change
Yes
Change camera
Image OK?
No
See hardware fault finding tree
No
Data errors in image
Yes
See hardware fault finding tree
No
Analyze general image quality by using example images, change camera module if quality is unusual

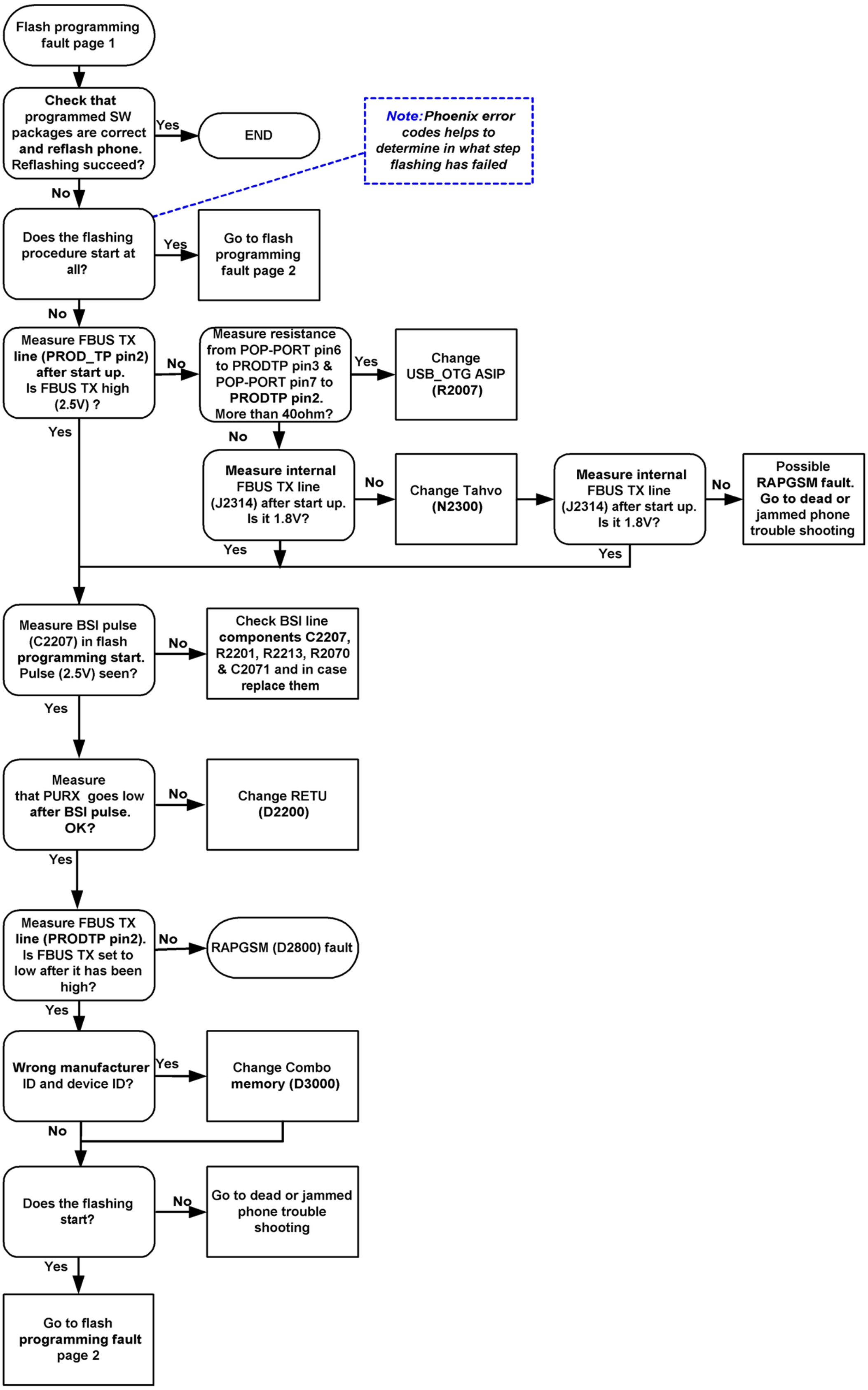
COMBO memory troubleshooting

Troubleshooting flow


Combo memory fault
Note: If combo memory (D3000) is changed, certificate restoring must be carried out to make phone functional again.
Measure Combo (D3000) supply voltages from C3005 VIO=1.8V & C3008 VDRAM=1.8V?
No
Check and replace C3001- C3009 if needed
Measure Combo (D3000) supply voltages from C3005 VIO=1.8V & C3008 VDRAM=1.8V?
No
Go to general power checking
Measure Combo (D3000) supply voltages from C3005 VIO=1.8V & C3008 VDRAM=1.8V?
No
Change Combo memory (D3000)
Yes
Yes
Yes
Measure Combo (D3000) supply voltages from C3005 VIO=1.8V & C3008 VDRAM=1.8V?
Yes
No
See Figure SDRAM CLK
Measure SDRAM CLK from J3001. CLK 117.6MHz (1.8V)?
No
Change Combo memory (D3000)
Measure SDRAM CLK from J3001. CLK 117.6MHz (1.8V)?
No
Go to general power checking
Measure SDRAM CLK from J3001. CLK 117.6MHz (1.8V)?
No
Yes
Yes
Yes
Problem occurs while booting?
Yes
Flash the phone if not done yet
Problem occurs while booting?
Yes
Change Combo memory (D3000) if not done yet
Problem occurs while booting?
Yes
Possible RAPGSM fault. Go to dead or jammed device
No
No
No
END

Flash programming fault troubleshooting

Part 1


Flash programming fault page 1
Check that programmed SW packages are correct and reflash phone. Reflashing succeed?
Yes
END
Note: Phoenix error codes helps to determine in what step flashing has failed
No
Does the flashing procedure start at all?
Yes
Go to flash programming fault page 2
No
Measure FBUS TX line (PROD_TP pin2) after start up. Is FBUS TX high (2.5V) ?
No
Measure resistance from POP-PORT pin6 to PRODTP pin3 & POP-PORT pin7 to PRODTP pin2. More than 40ohm?
Yes
Change USB_OTG ASIP (R2007)
No
Measure internal FBUS TX line (J2314) after start up. Is it 1.8V?
No
Change Tahvo (N2300)
Measure internal FBUS TX line (J2314) after start up. Is it 1.8V?
No
Possible RAPGSM fault. Go to dead or jammed phone trouble shooting
Yes
Yes
Yes
Measure BSI pulse (C2207) in flash programming start. Pulse (2.5V) seen?
No
Check BSI line components C2207, R2201, R2213, R2070 & C2071 and in case replace them
Yes
Measure that PURX goes low after BSI pulse. OK?
No
Change RETU (D2200)
Yes
Measure FBUS TX line (PRODTP pin2). Is FBUS TX set to low after it has been high?
No
RAPGSM (D2800) fault
Yes
Wrong manufacturer ID and device ID?
Yes
Change Combo memory (D3000)
No
Does the flashing start?
No
Go to dead or jammed phone trouble shooting
Yes
Go to flash programming fault page 2

Part 2

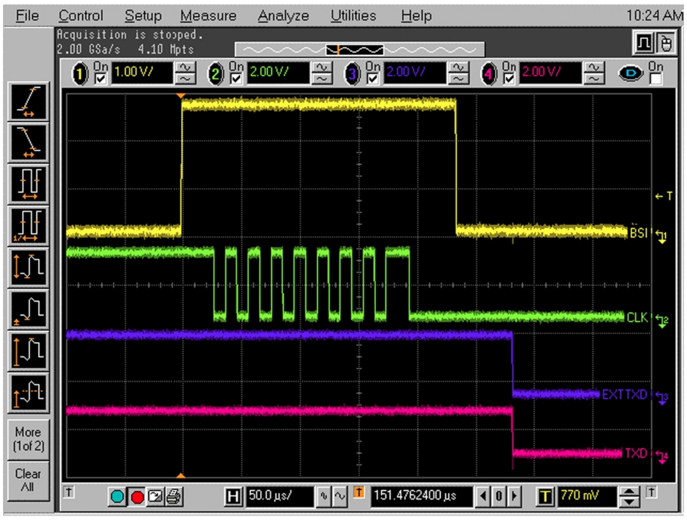

File Control Setup Measure Analyze Utilities Help
10:24 AM
Acquisition is stopped.
2.00 GSa/s 4.10 Mpts
1 On 1.00 V/
2 On 2.00 V/
3 On 2.00 V/
4 On 2.00 V/
BSI
CLK
EXTTXD
TXD
More (1 of 2)
Clear All
H 50.0 µs/
151.4762400 µs
T 770 mV

Figure 42 Flashing pic 1. Take single trig measurement for the rise of the BSI signal.

Saved: 05 JUL 2004 13:24:19

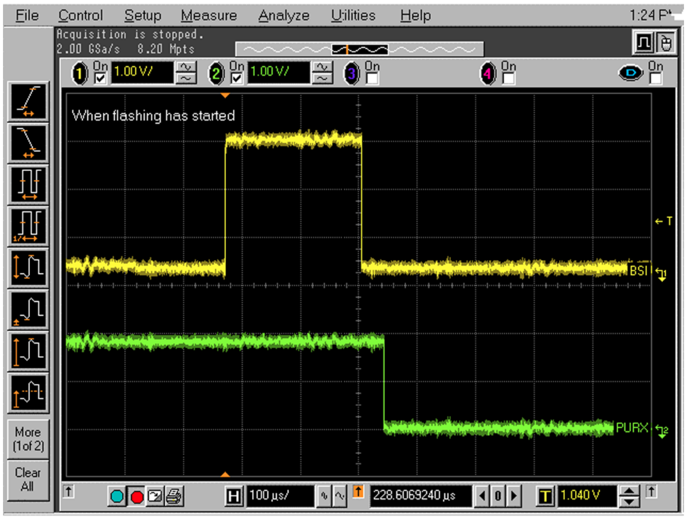
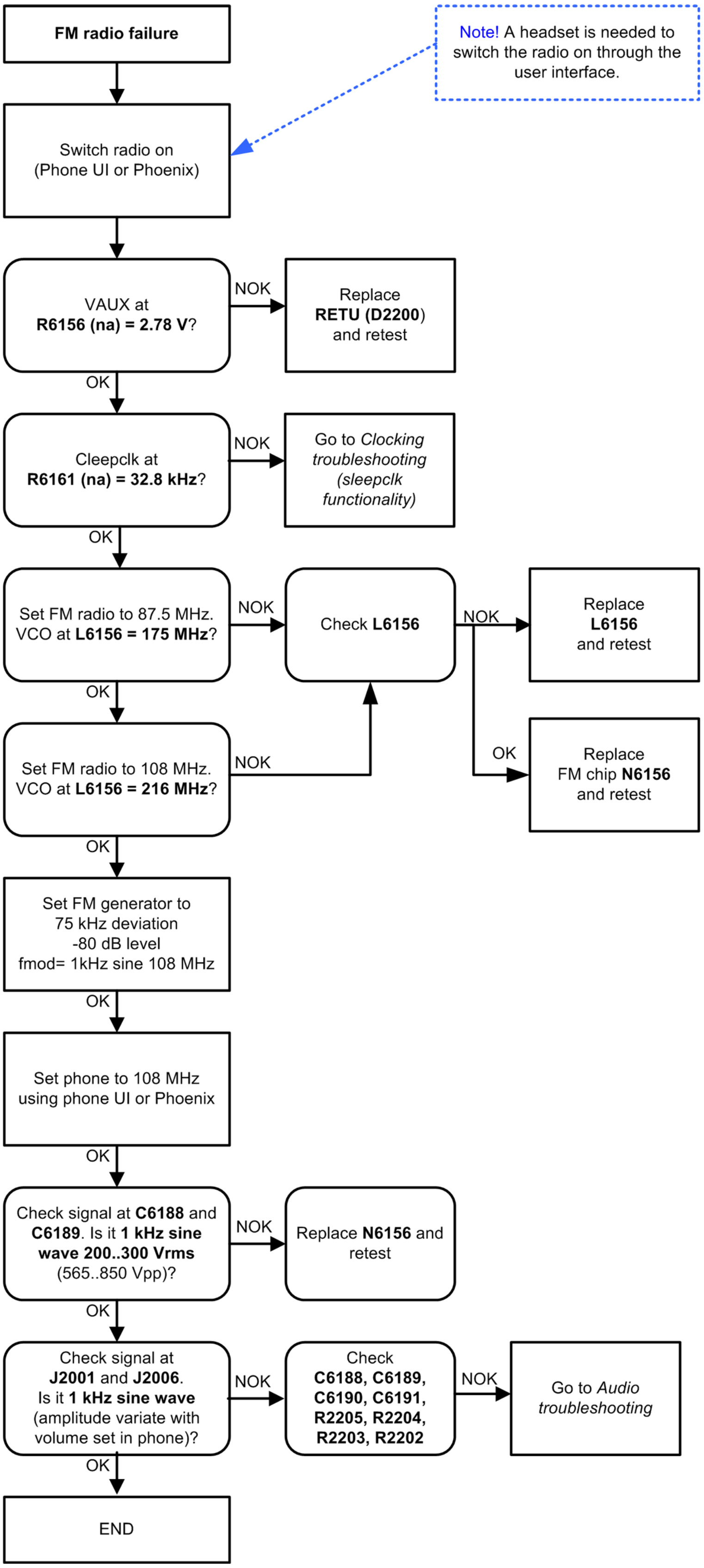

File Control Setup Measure Analyze Utilities Help
1:24 P
Acquisition is stopped.
2.00 GSa/s 8.20 Mpts
1 On 1.00 V/
2 On 1.00 V/
3 On
4 On
When flashing has started
BSI
PURX
More (1 of 2)
Clear All
H 100 µs/
228.6069240 µs
T 1.040 V

Figure 43 Flashing pic 2. Take single trig measurement for the rise of the BSI signal.

FM radio troubleshooting

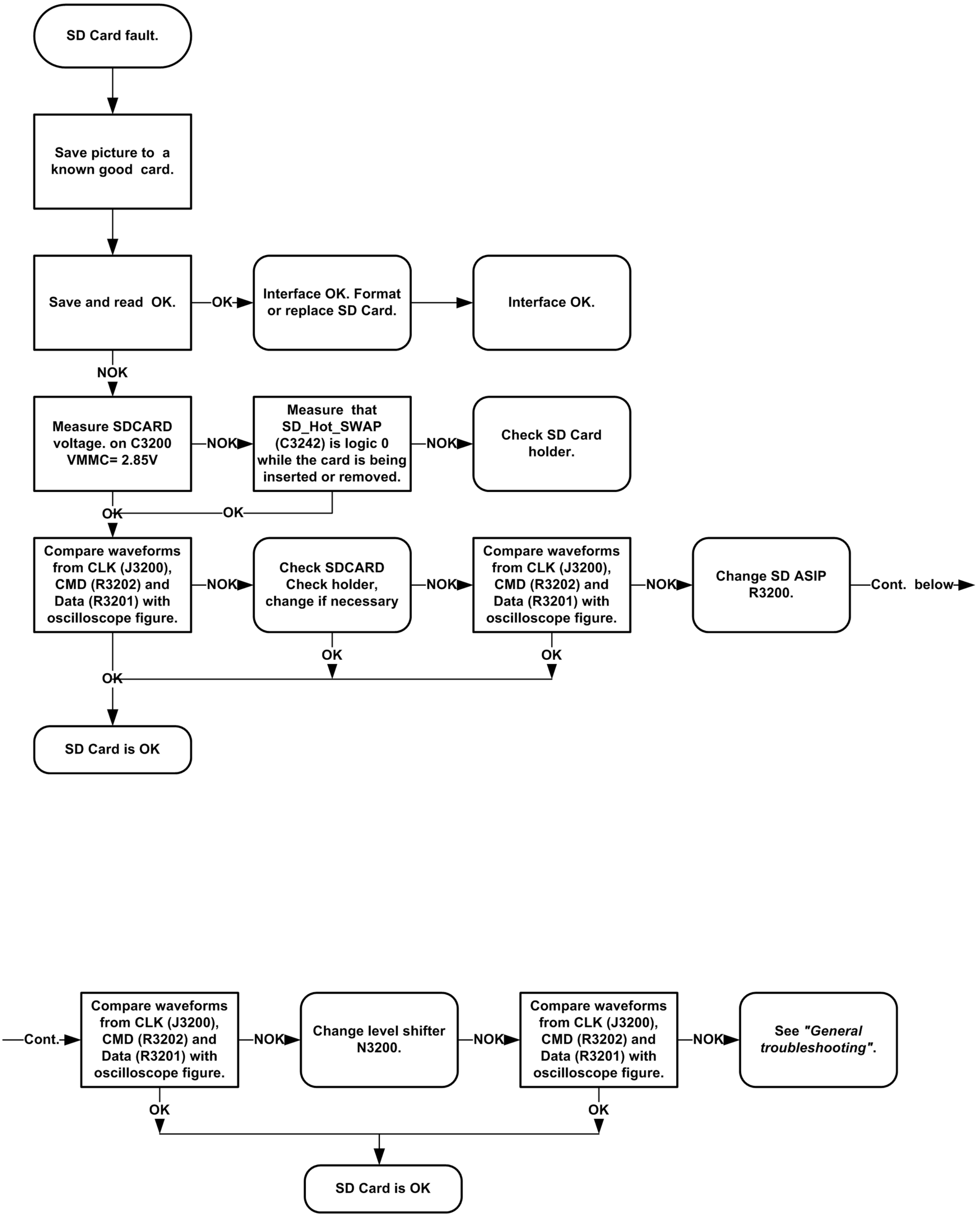
Troubleshooting flow

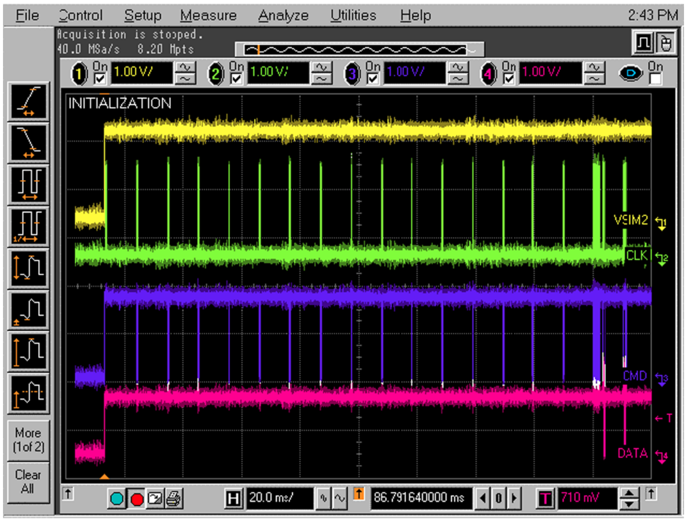
Note: FM radio is not supported by all variants!


FM radio failure
Note! A headset is needed to switch the radio on through the user interface.
Switch radio on (Phone UI or Phoenix)
VAUX at R6156 (na) = 2.78 V?
NOK
Replace RETU (D2200) and retest
OK
Cleepclk at R6161 (na) = 32.8 kHz?
NOK
Go to Clocking troubleshooting (sleepclk functionality)
OK
Set FM radio to 87.5 MHz. VCO at L6156 = 175 MHz?
NOK
Check L6156
NOK
Replace L6156 and retest
OK
Replace FM chip N6156 and retest
OK
Set FM radio to 108 MHz. VCO at L6156 = 216 MHz?
NOK
OK
Set FM generator to 75 kHz deviation -80 dB level fmod= 1kHz sine 108 MHz
OK
Set phone to 108 MHz using phone UI or Phoenix
OK
Check signal at C6188 and C6189. Is it 1 kHz sine wave 200..300 Vrms (565..850 Vpp)?
NOK
Replace N6156 and retest
OK
Check signal at J2001 and J2006. Is it 1 kHz sine wave (amplitude variate with volume set in phone)?
NOK
Check C6188, C6189, C6190, C6191, R2205, R2204, R2203, R2202
NOK
Go to Audio troubleshooting
OK
END

SD card troubleshooting

Troubleshooting flow


SD Card fault.
Save picture to a known good card.
Save and read OK.
OK
Interface OK. Format or replace SD Card.
Interface OK.
NOK
Measure SDCARD voltage. on C3200 VMMC= 2.85V
NOK
Measure that SD_Hot_SWAP (C3242) is logic 0 while the card is being inserted or removed.
NOK
Check SD Card holder.
OK
OK
Compare waveforms from CLK (J3200), CMD (R3202) and Data (R3201) with oscilloscope figure.
NOK
Check SDCARD Check holder, change if necessary
NOK
Compare waveforms from CLK (J3200), CMD (R3202) and Data (R3201) with oscilloscope figure.
NOK
Change SD ASIP R3200.
Cont. below
OK
OK
OK
SD Card is OK
Cont.
Compare waveforms from CLK (J3200), CMD (R3202) and Data (R3201) with oscilloscope figure.
NOK
Change level shifter N3200.
NOK
Compare waveforms from CLK (J3200), CMD (R3202) and Data (R3201) with oscilloscope figure.
NOK
See "General troubleshooting".
OK
OK
SD Card is OK



```
Acquisition is stopped.
40.0 MSa/s   8.20 Mpts
```

File
Control
Setup
Measure
Analyze
Utilities
Help
2:43 PM
1.00 V/
1.00 V/
1.00 V/
1.00 V/
INITIALIZATION
VSIM2
CLK
CMD
T
DATA
More (1of 2)
Clear All
20.0 ms/
86.791640000 ms
710 mV

Take single trig measurement on the rising edge of the DAT signal.

Figure 44 SD card initialization from pin J3206

User interface troubleshooting

Display module troubleshooting

General instructions for display troubleshooting

Context

- The display is in a normal mode when the phone is in active use.
- Display is in a partial idle mode when the phone is in the screen saver mode.
- The operating modes of the display can be controlled with the help of *Phoenix*.

Table 13 Display module troubleshooting cases

Display blank	There is no image on the display. The display looks the same when the phone is on as it does when the phone is off. The backlight can be on in some cases.
Image on the display not correct	Image on the display can be corrupted or a part of the image can be missing. If a part of the image is missing, change the display module. If the image is otherwise corrupted, follow the appropriate troubleshooting diagram.
Backlight dim or not working at all	Backlight LED components are inside the display module. Backlight failure can also be in the connector or in the backlight power source in the main engine of the phone. This means that in case the display is working (image OK), the backlight is faulty.

Visual defects (pixel)	Pixel defects can be checked by controlling the display with Phoenix. Use both colours, black and white, on a full screen. The display may have some random pixel defects that are acceptable for this type of display. The criteria when pixel defects are regarded as a display failure, resulting in a replacement of the display, are presented the following table.

Table 14 Pixel defects

Item		White dot defect				Black dot defect	Total
1	Defect counts	R	G	B	White Dot Total	1	1
		1	1	1	1		
2	Combined defect counts	Not allowed. Two single dot defects that are within 5 mm of each other should be interpreted as combined dot defect.					

Steps

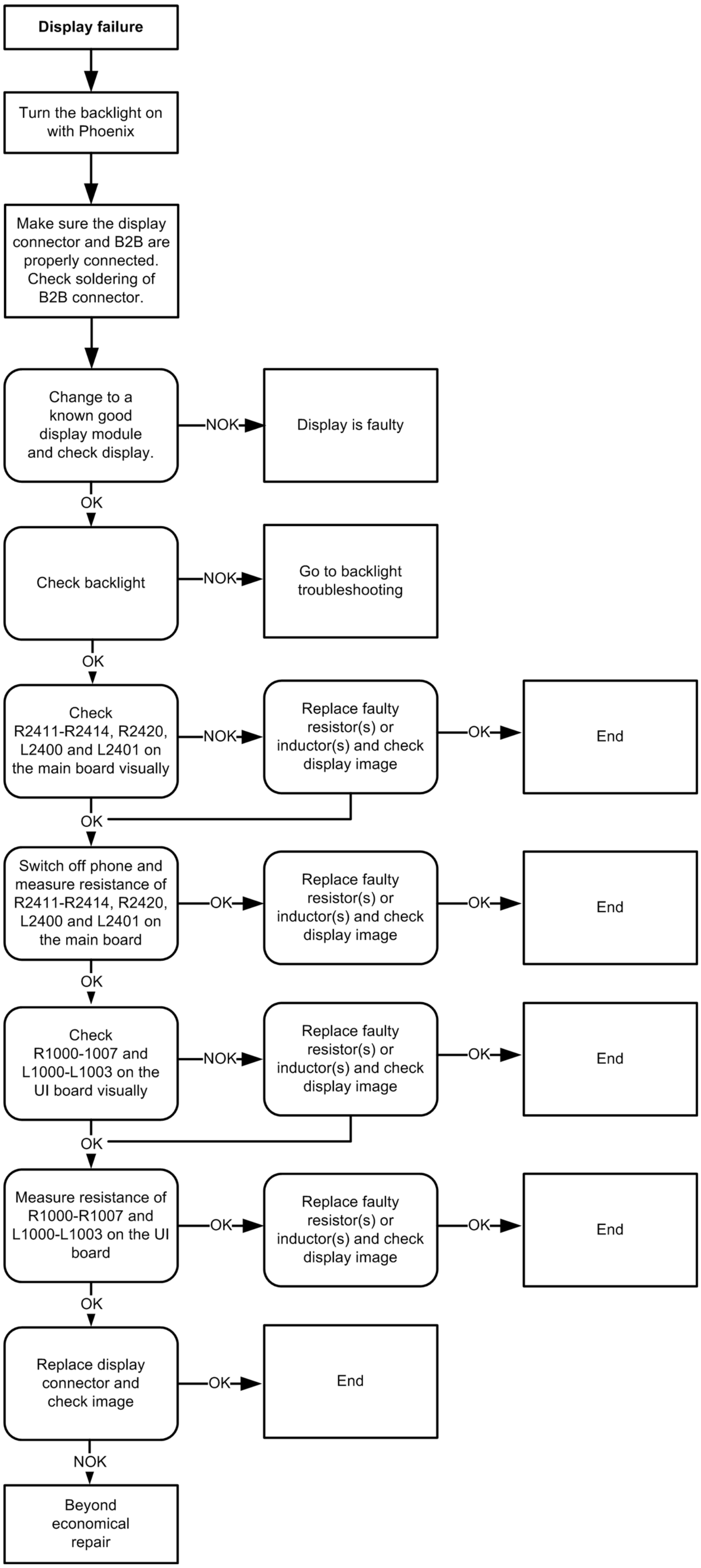
1. Verify with a working display that the fault is not on the display module itself.

   The display module cannot be repaired.
2. Check that the cellular engine is working normally.
   - i To check the functionality, connect the phone to a docking station.
   - ii Start *Phoenix* service software.
   - iii Read the phone information to check that also the application engine is functioning normally (you should be able to read the APE ID).
3. Proceed to the display troubleshooting flowcharts.

   Use the **Display Test** tool in *Phoenix* to find the detailed fault mode.

Display troubleshooting

Troubleshooting flow

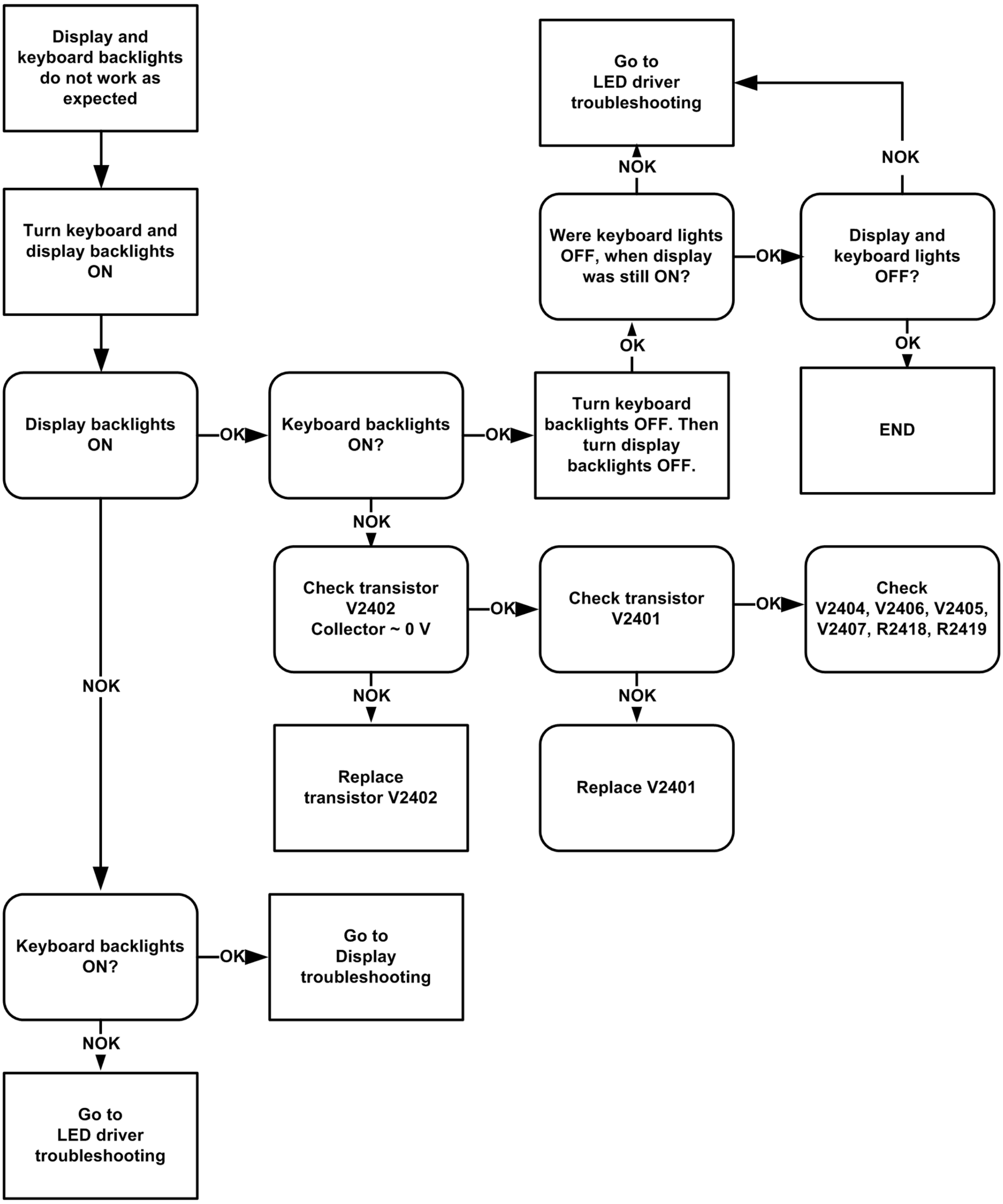

Display failure
Turn the backlight on with Phoenix
Make sure the display connector and B2B are properly connected. Check soldering of B2B connector.
Change to a known good display module and check display.
NOK
Display is faulty
OK
Check backlight
NOK
Go to backlight troubleshooting
OK
Check R2411-R2414, R2420, L2400 and L2401 on the main board visually
NOK
Replace faulty resistor(s) or inductor(s) and check display image
OK
End
OK
Switch off phone and measure resistance of R2411-R2414, R2420, L2400 and L2401 on the main board
OK
Replace faulty resistor(s) or inductor(s) and check display image
OK
End
OK
Check R1000-1007 and L1000-L1003 on the UI board visually
NOK
Replace faulty resistor(s) or inductor(s) and check display image
OK
End
OK
Measure resistance of R1000-R1007 and L1000-L1003 on the UI board
OK
Replace faulty resistor(s) or inductor(s) and check display image
OK
End
OK
Replace display connector and check image
OK
End
NOK
Beyond economical repair

Backlight troubleshooting

Context

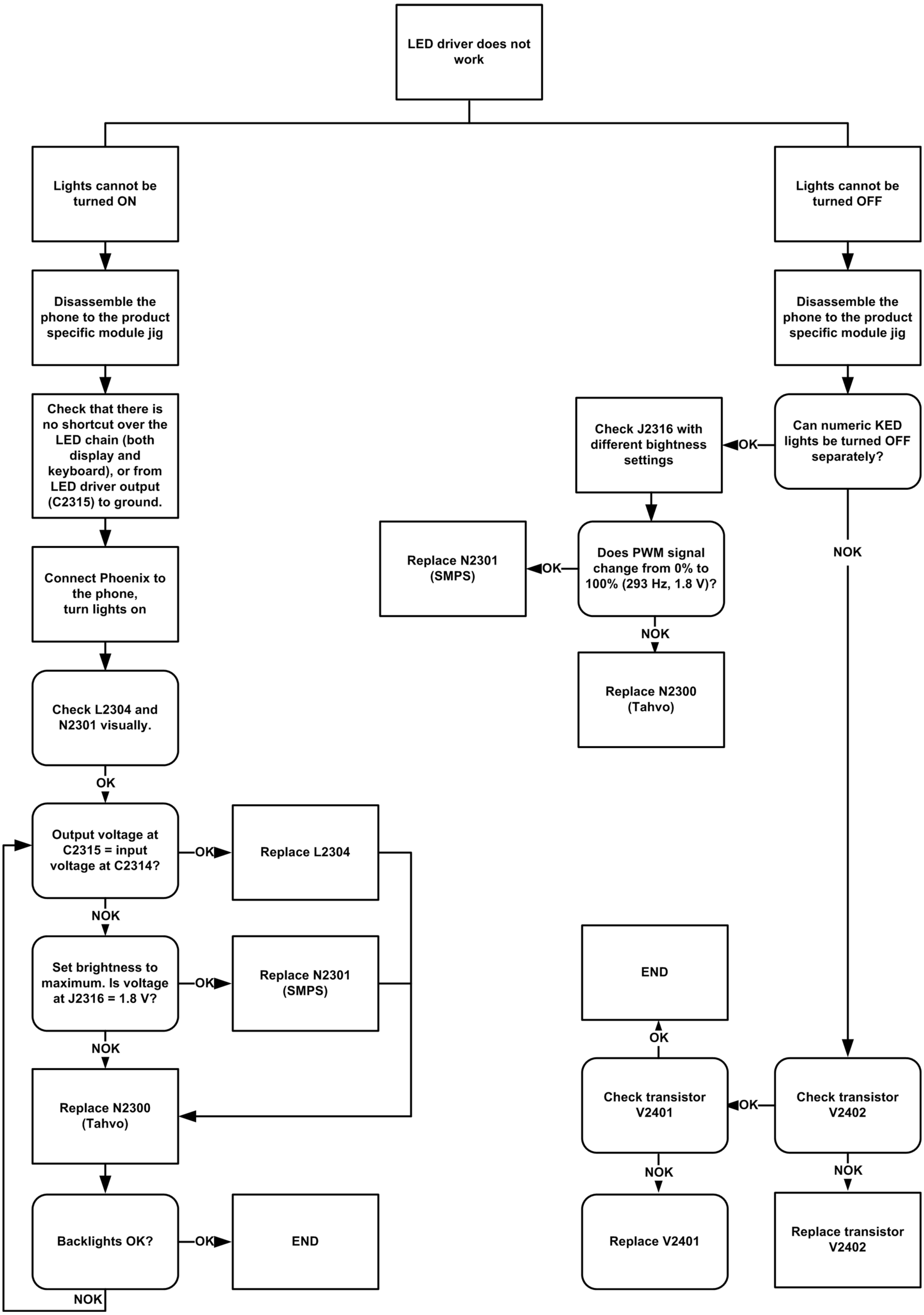
The device has one LED driver that provides current for both display and keyboard backlights. Brightness can be adjusted manually. It affects both display and keypad. Keyboard backlights can be turned ON/OFF separately but not without switching on the display lights.

Display and keyboard backlight troubleshooting


Display and keyboard backlights do not work as expected
Turn keyboard and display backlights ON
Display backlights ON
OK
Keyboard backlights ON?
OK
Turn keyboard backlights OFF. Then turn display backlights OFF.
OK
Were keyboard lights OFF, when display was still ON?
NOK
Go to LED driver troubleshooting
OK
Display and keyboard lights OFF?
NOK
OK
END
NOK
Check transistor V2402 Collector ~ 0 V
OK
Check transistor V2401
OK
Check V2404, V2406, V2405, V2407, R2418, R2419
NOK
Replace transistor V2402
NOK
Replace V2401
NOK
Keyboard backlights ON?
OK
Go to Display troubleshooting
NOK
Go to LED driver troubleshooting

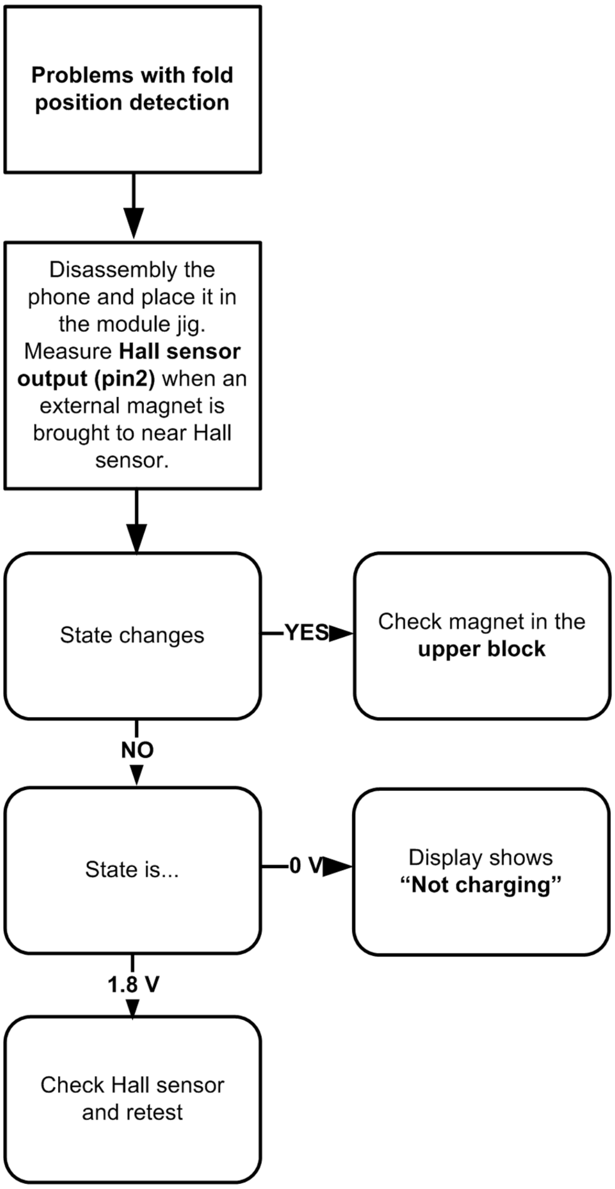
LED driver troubleshooting

LED driver troubleshooting


LED driver does not work
Lights cannot be turned ON
Disassemble the phone to the product specific module jig
Check that there is no shortcut over the LED chain (both display and keyboard), or from LED driver output (C2315) to ground.
Connect Phoenix to the phone, turn lights on
Check L2304 and N2301 visually.
OK
Output voltage at C2315 = input voltage at C2314?
OK
Replace L2304
NOK
Set brightness to maximum. Is voltage at J2316 = 1.8 V?
OK
Replace N2301 (SMPS)
NOK
Replace N2300 (Tahvo)
Backlights OK?
OK
END
NOK
Lights cannot be turned OFF
Disassemble the phone to the product specific module jig
Can numeric KED lights be turned OFF separately?
OK
Check J2316 with different bightness settings
Does PWM signal change from 0% to 100% (293 Hz, 1.8 V)?
OK
Replace N2301 (SMPS)
NOK
Replace N2300 (Tahvo)
NOK
Check transistor V2402
OK
Check transistor V2401
OK
END
NOK
Replace V2401
NOK
Replace transistor V2402

Hall sensor (switch) troubleshooting

Troubleshooting flow


Problems with fold position detection
Disassembly the phone and place it in the module jig. Measure Hall sensor output (pin2) when an external magnet is brought to near Hall sensor.
State changes
YES
Check magnet in the upper block
NO
State is...
0 V
Display shows "Not charging"
1.8 V
Check Hall sensor and retest

Audio troubleshooting

Introduction to acoustics troubleshooting

Note: Always make sure all openings are clean and all contact pads are intact and make contact. If audio still does not work, please continue to the electronic audio troubleshooting (2nd diagram where applicable).

Acoustics design ensures that the sound is detected correctly with a microphone and properly radiated to the outside of the device by speaker(s). The acoustics of the phone includes three basic systems: earpiece, Integrated Hands Free (IHF) and microphone.

The sound reproduced from the earpiece readiates through a single hole on the front cover (A-cover). The sound reproduced from the IHF speaker radiates from a single sound hole located 3 cm below the power key. The microphone is located at the hinge, next to the system connector.

For a correct functionality of the phone, all sound holes must be always open. When the phone is used, care must be taken not to close any of those holes with a hand or fingers. The phone should be dry and clean, and no objects must be located in such a way that they close any of the holes.

Audio troubleshooting test instructions

Differential external earpiece and internal earpiece outputs can be measured either with a single-ended or a differential probe.

When measuring with a single-ended probe each output is measured against the ground.

Internal handsfree output is measured using a current probe, if a special low-pass filter designed for measuring a digital amplifier is not available. Note also that when using a current probe, the input signal frequency must be set to 2kHz.

The input signal for each loop test can be either single-ended or differential.

Required equipment

The following equipment is needed for the tests:

- Oscilloscope
- Function generator (sine waveform)
- Current probe (Internal handsfree PWM output measurement)
- Phoenix service software
- Battery voltage 3.7V

Test procedure

Audio can be tested using the Phoenix audio routings option. Three different audio loop paths can be activated:

- External microphone to Internal earpiece
- External microphone to Internal handsfree speaker
- Internal microphone to External earpiece

Each audio loop sets routing from the specified input to the specified output enabling a quick in-out test. Loop path gains are fixed and they cannot be changed using Phoenix. Correct pins and signals for each test are presented in the following table.

Phoenix audio loop tests and test results

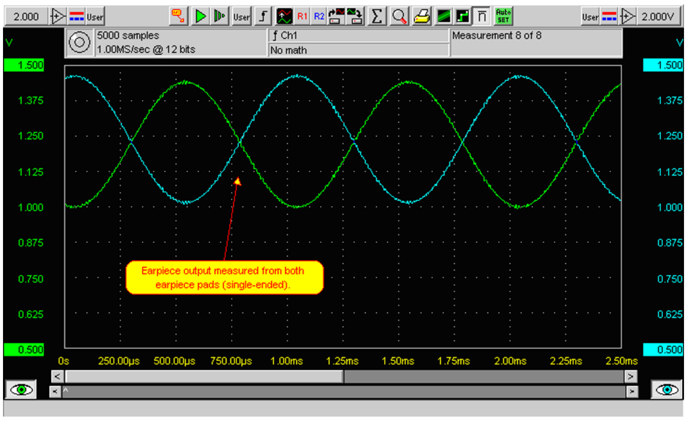
The results presented in the table apply when no accessory is connected and battery voltage is set to 3.7V.

Earpiece, internal microphone and speaker are in place during measurement. Applying a headset accessory during measurement causes a significant drop in measured quantities.

The gain values presented in the table apply for a differential output vs. single-ended/differential input.

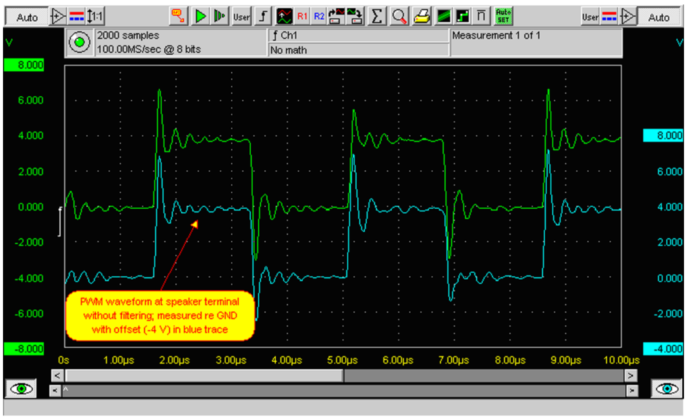
Loop test	Input terminal	Output terminal	Path gain [dB] (fixed)	Input voltage [mVp-p]	Differential output voltage [mVp-p]	Output DC level [V]	Output current [mA]
External Mic to External Earpiece	XMICP and GND	HSEAR R P, HSEAR R N and GND	-2.9	1000	720	1.2	NA
		HSEAR P, HSEAR N and GND					
	XMICN and GND	HSEAR R P, HSEAR R N and GND					
		HSEAR P, HSEAR N and GND					
External Mic to Internal Earpiece	XMICP and GND	EarP and GND	-4.0	750	490	1.2	NA
		EarN and GND					
	XMICN and GND	EarP and GND					
		EarN and GND					
External Mic to Internal handsfree	XMICP and GND	B2102 pads	8.5	920	2520	0	25mA (calc.)
	XMICN and GND	B2102 pads					
Internal Mic to External Earpiece	B2100 (OUT/ GND)	HSEAR R P, HSEAR R N and GND	22.7	100	1360	1.2	NA
		HSEAR P, HSEAR N and GND					
		HSEAR R P, HSEAR R N and GND					
		HSEAR P, HSEAR N and GND					

Measurement data


2.000
User
2.000V
5000 samples
1.00MS/sec @ 12 bits
Ch1
No math
Measurement 8 of 8
V
1.500
1.375
1.250
1.125
1.000
0.875
0.750
0.625
0.500
0s
250.00µs
500.00µs
750.00µs
1.00ms
1.25ms
1.50ms
1.75ms
2.00ms
2.25ms
2.50ms

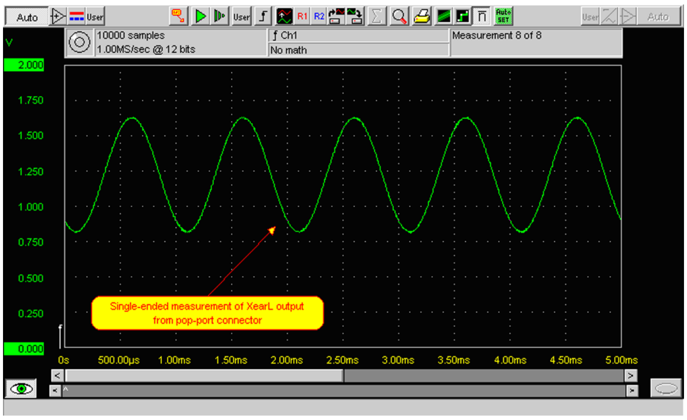
Earpiece output measured from both earpiece pads (single-ended).

Figure 45 Single-ended output waveform of the Ext_in_HP_out measurement when earpiece is connected.


Auto
1:1
User
Auto
2000 samples
100.00MS/sec @ 8 bits
Ch1
No math
Measurement 1 of 1
V
8.000
6.000
4.000
2.000
0.000
-2.000
-4.000
-6.000
-8.000
8.000
6.000
4.000
2.000
0.000
-2.000
-4.000
0s
1.00µs
2.00µs
3.00µs
4.00µs
5.00µs
6.00µs
7.00µs
8.00µs
9.00µs
10.00µs

PWM waveform at speaker terminal without filtering; measured re GND with offset (-4 V) in blue trace

Figure 46 Differential output waveform of the Ext_in_IHF_out out loop measurement when speaker is connected.

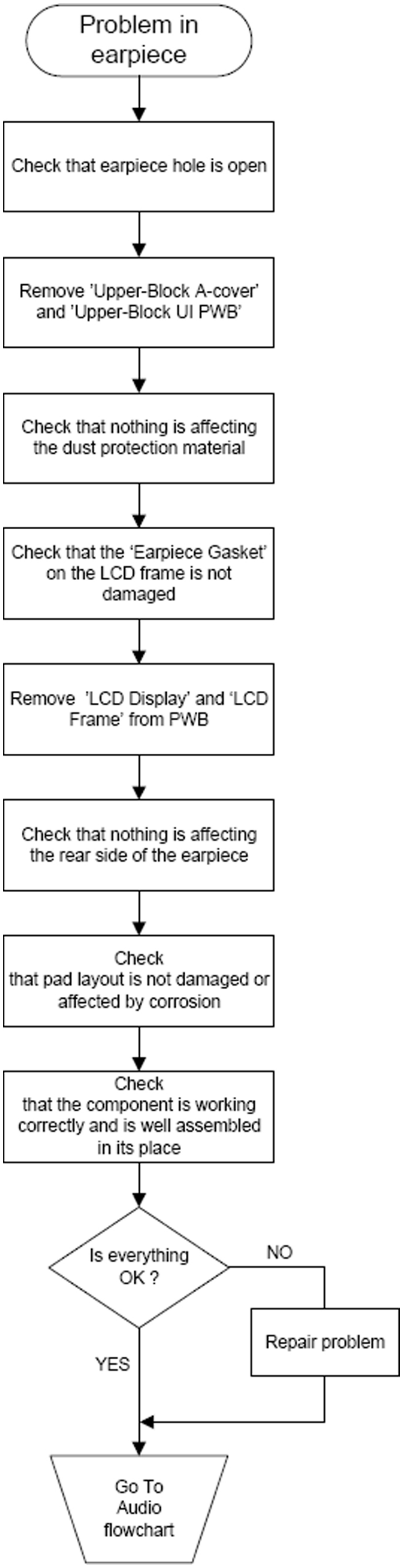

Auto
User
Auto
10000 samples
1.00MS/sec @ 12 bits
Ch1
No math
Measurement 8 of 8
V
2.000
1.750
1.500
1.250
1.000
0.750
0.500
0.250
0.000
0s
500.00µs
1.00ms
1.50ms
2.00ms
2.50ms
3.00ms
3.50ms
4.00ms
4.50ms
5.00ms

Single-ended measurement of XearL output from pop-port connector

Figure 47 Single-ended output waveform of the HP_in_Ext_out loop when microphone is connected.

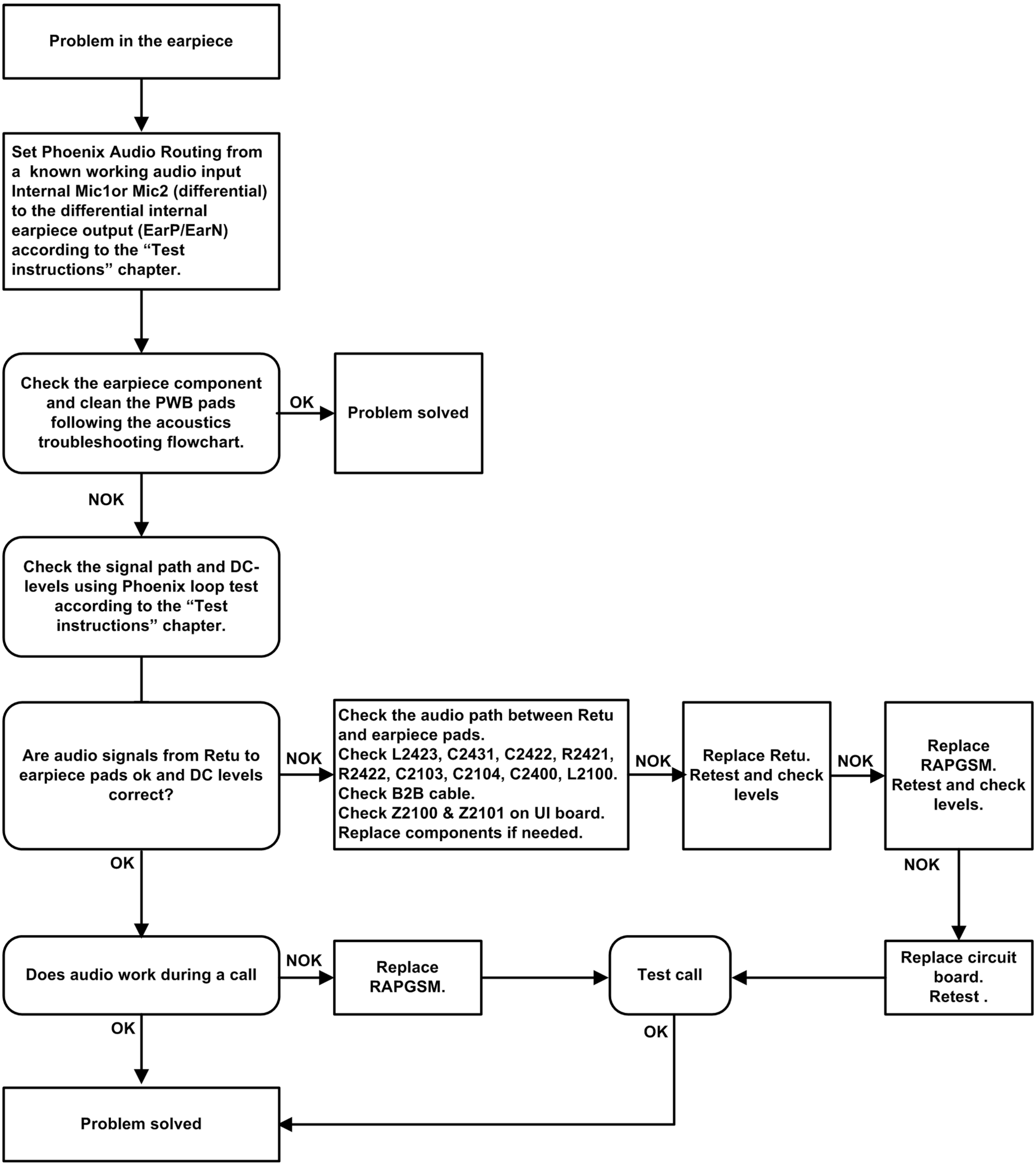
Earpiece troubleshooting

Troubleshooting flow


Problem in earpiece
Check that earpiece hole is open
Remove 'Upper-Block A-cover' and 'Upper-Block UI PWB'
Check that nothing is affecting the dust protection material
Check that the 'Earpiece Gasket' on the LCD frame is not damaged
Remove 'LCD Display' and 'LCD Frame' from PWB
Check that nothing is affecting the rear side of the earpiece
Check that pad layout is not damaged or affected by corrosion
Check that the component is working correctly and is well assembled in its place
Is everything OK ?
NO
Repair problem
YES
Go To Audio flowchart

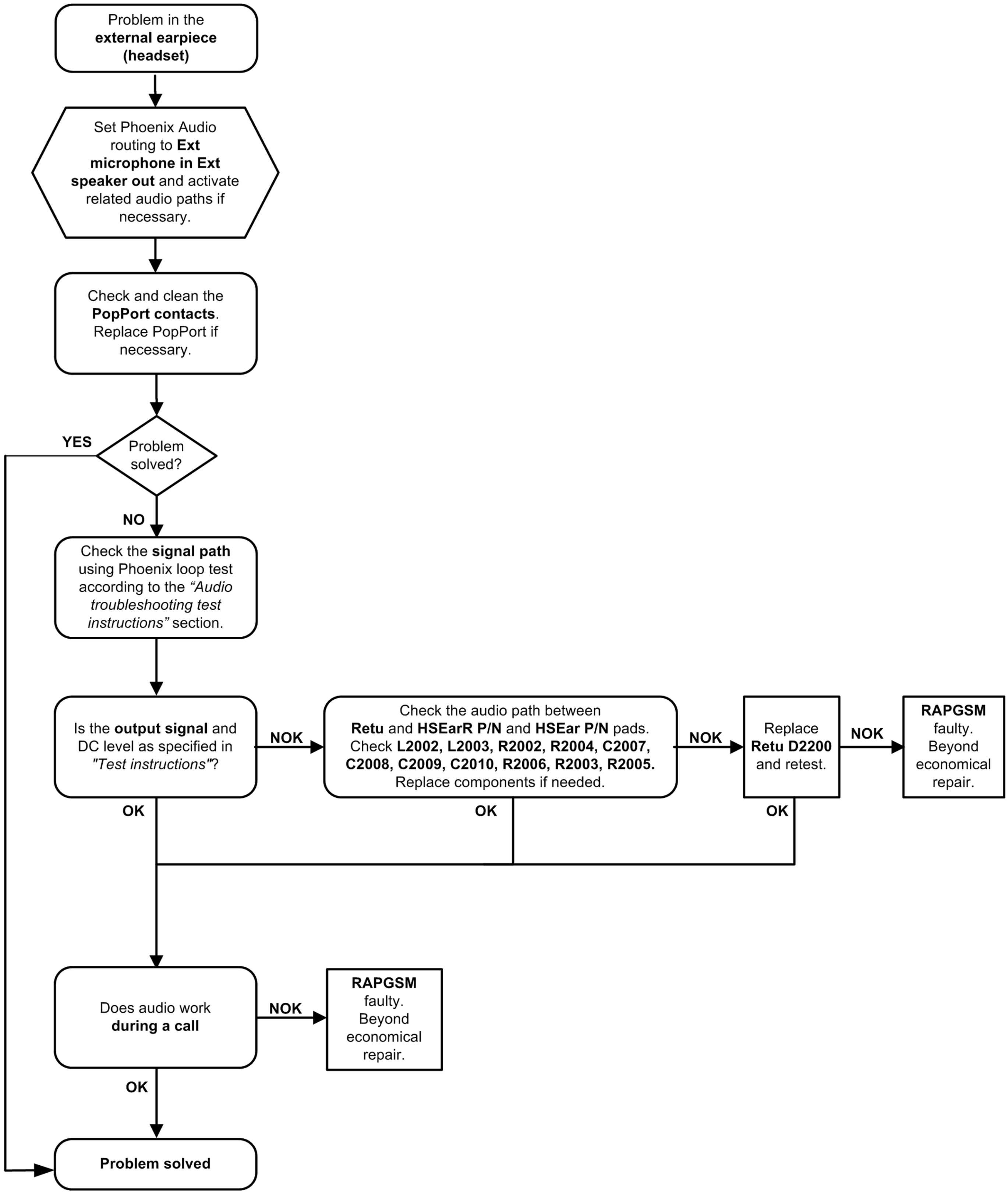
Internal earpiece troubleshooting

Troubleshooting flow


Problem in the earpiece
Set Phoenix Audio Routing from a known working audio input Internal Mic1or Mic2 (differential) to the differential internal earpiece output (EarP/EarN) according to the “Test instructions” chapter.
Check the earpiece component and clean the PWB pads following the acoustics troubleshooting flowchart.
OK
Problem solved
NOK
Check the signal path and DC-levels using Phoenix loop test according to the “Test instructions” chapter.
Are audio signals from Retu to earpiece pads ok and DC levels correct?
NOK
Check the audio path between Retu and earpiece pads.
Check L2423, C2431, C2422, R2421, R2422, C2103, C2104, C2400, L2100.
Check B2B cable.
Check Z2100 & Z2101 on UI board.
Replace components if needed.
NOK
Replace Retu. Retest and check levels
NOK
Replace RAPGSM. Retest and check levels.
NOK
OK
Replace circuit board. Retest .
Does audio work during a call
NOK
Replace RAPGSM.
Test call
OK
OK
Problem solved

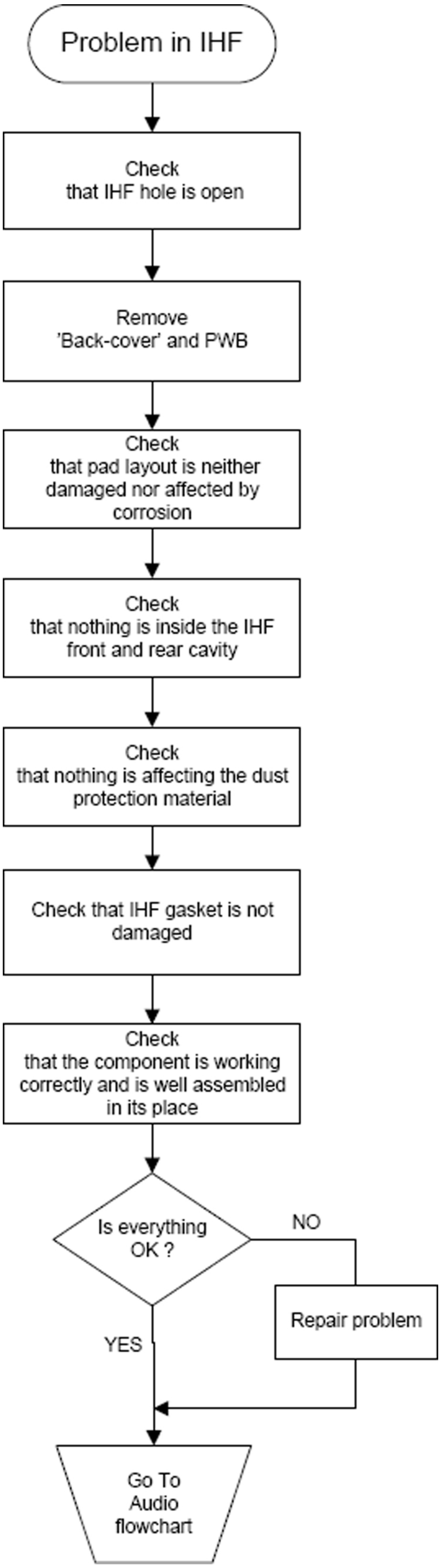
External headset earpiece troubleshooting

Troubleshooting flow


Problem in the **external earpiece (headset)**
Set Phoenix Audio routing to **Ext microphone in Ext speaker out** and activate related audio paths if necessary.
Check and clean the **PopPort contacts**. Replace PopPort if necessary.
Problem solved?
YES
NO
Check the **signal path** using Phoenix loop test according to the *"Audio troubleshooting test instructions"* section.
Is the **output signal** and DC level as specified in *"Test instructions"*?
NOK
Check the audio path between **Retu** and **HSEarR P/N** and **HSEar P/N** pads. Check **L2002, L2003, R2002, R2004, C2007, C2008, C2009, C2010, R2006, R2003, R2005.** Replace components if needed.
NOK
Replace **Retu D2200** and retest.
NOK
RAPGSM faulty. Beyond economical repair.
OK
OK
OK
Does audio work **during a call**
NOK
RAPGSM faulty. Beyond economical repair.
OK
Problem solved

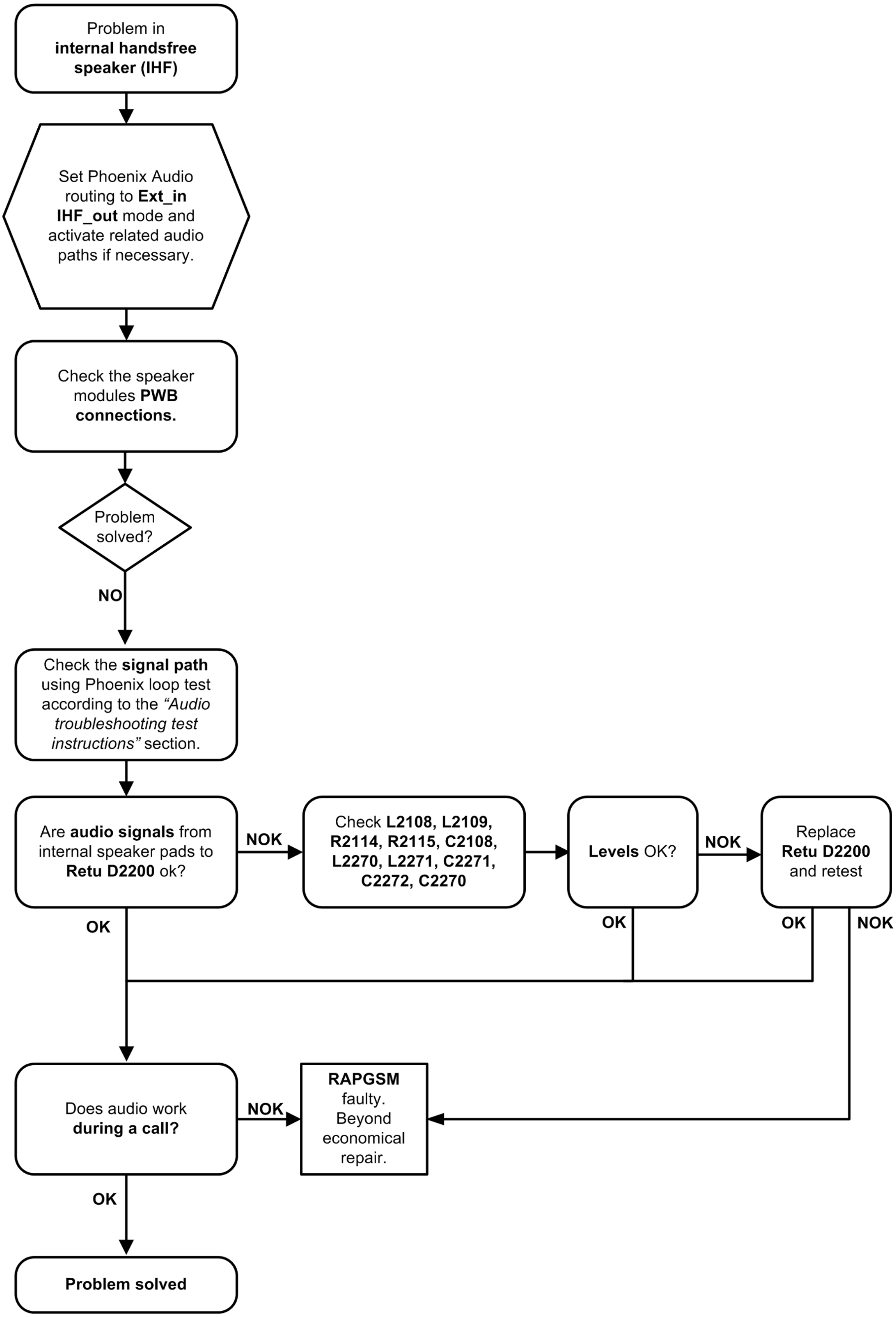
IHF troubleshooting

Troubleshooting flow


Problem in IHF
Check that IHF hole is open
Remove 'Back-cover' and PWB
Check that pad layout is neither damaged nor affected by corrosion
Check that nothing is inside the IHF front and rear cavity
Check that nothing is affecting the dust protection material
Check that IHF gasket is not damaged
Check that the component is working correctly and is well assembled in its place
Is everything OK ?
NO
Repair problem
YES
Go To Audio flowchart

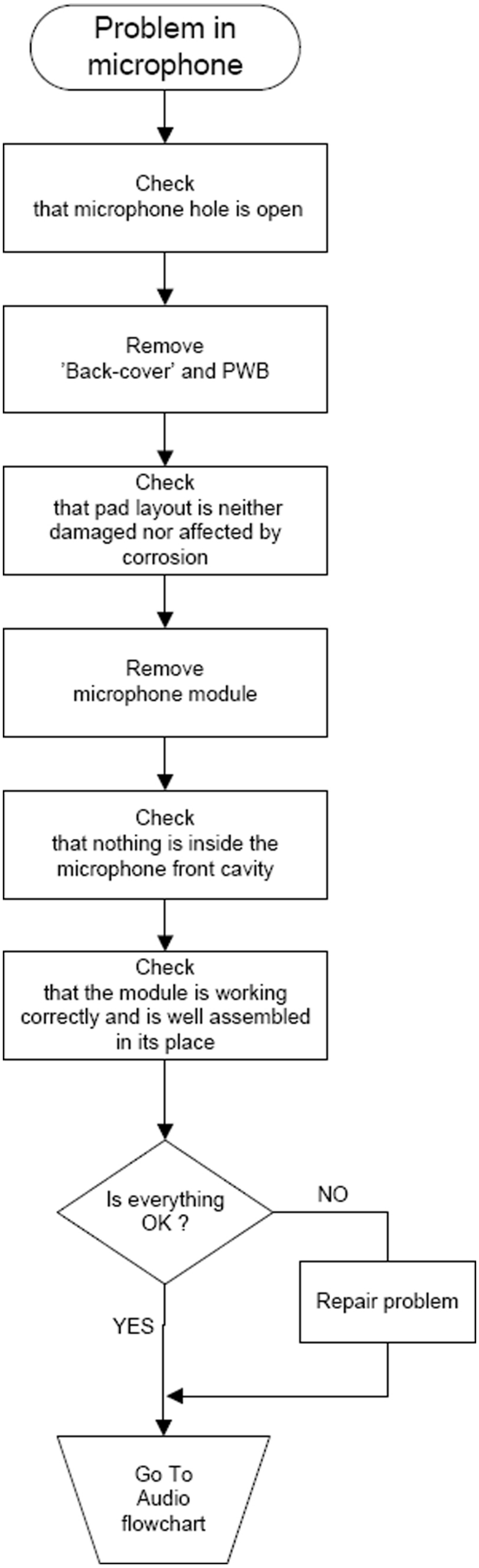
IHF troubleshooting

Troubleshooting flow


Problem in
internal handsfree speaker (IHF)
Set Phoenix Audio routing to **Ext_in IHF_out** mode and activate related audio paths if necessary.
Check the speaker modules **PWB connections.**
Problem solved?
NO
Check the **signal path** using Phoenix loop test according to the *"Audio troubleshooting test instructions"* section.
Are **audio signals** from internal speaker pads to **Retu D2200** ok?
NOK
Check **L2108, L2109, R2114, R2115, C2108, L2270, L2271, C2271, C2272, C2270**
Levels OK?
NOK
Replace **Retu D2200** and retest
OK
OK
OK
NOK
Does audio work **during a call?**
NOK
RAPGSM faulty. Beyond economical repair.
OK
Problem solved

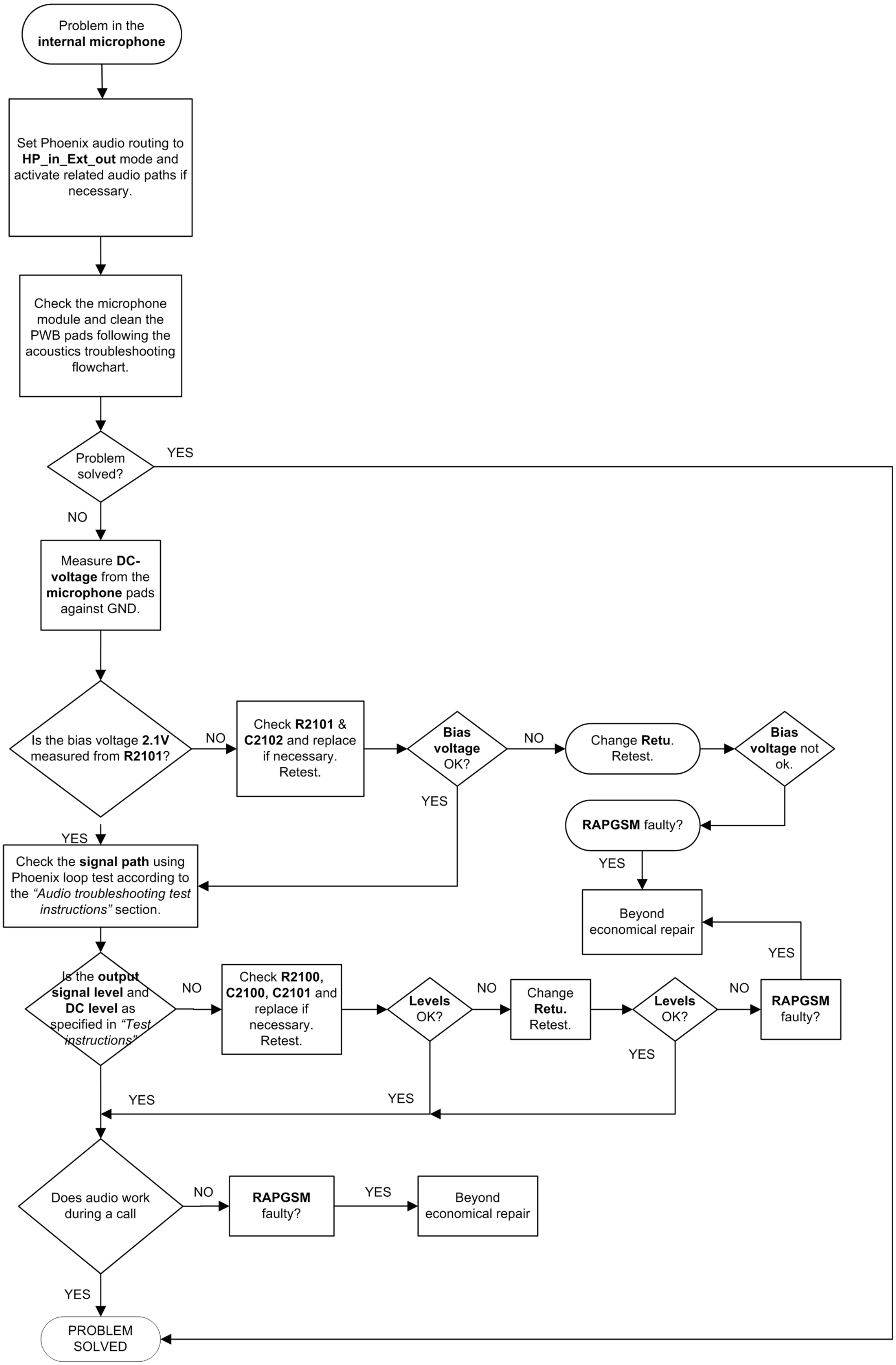
Microphone troubleshooting

Troubleshooting flow


Problem in microphone
Check that microphone hole is open
Remove 'Back-cover' and PWB
Check that pad layout is neither damaged nor affected by corrosion
Remove microphone module
Check that nothing is inside the microphone front cavity
Check that the module is working correctly and is well assembled in its place
Is everything OK ?
NO
Repair problem
YES
Go To Audio flowchart

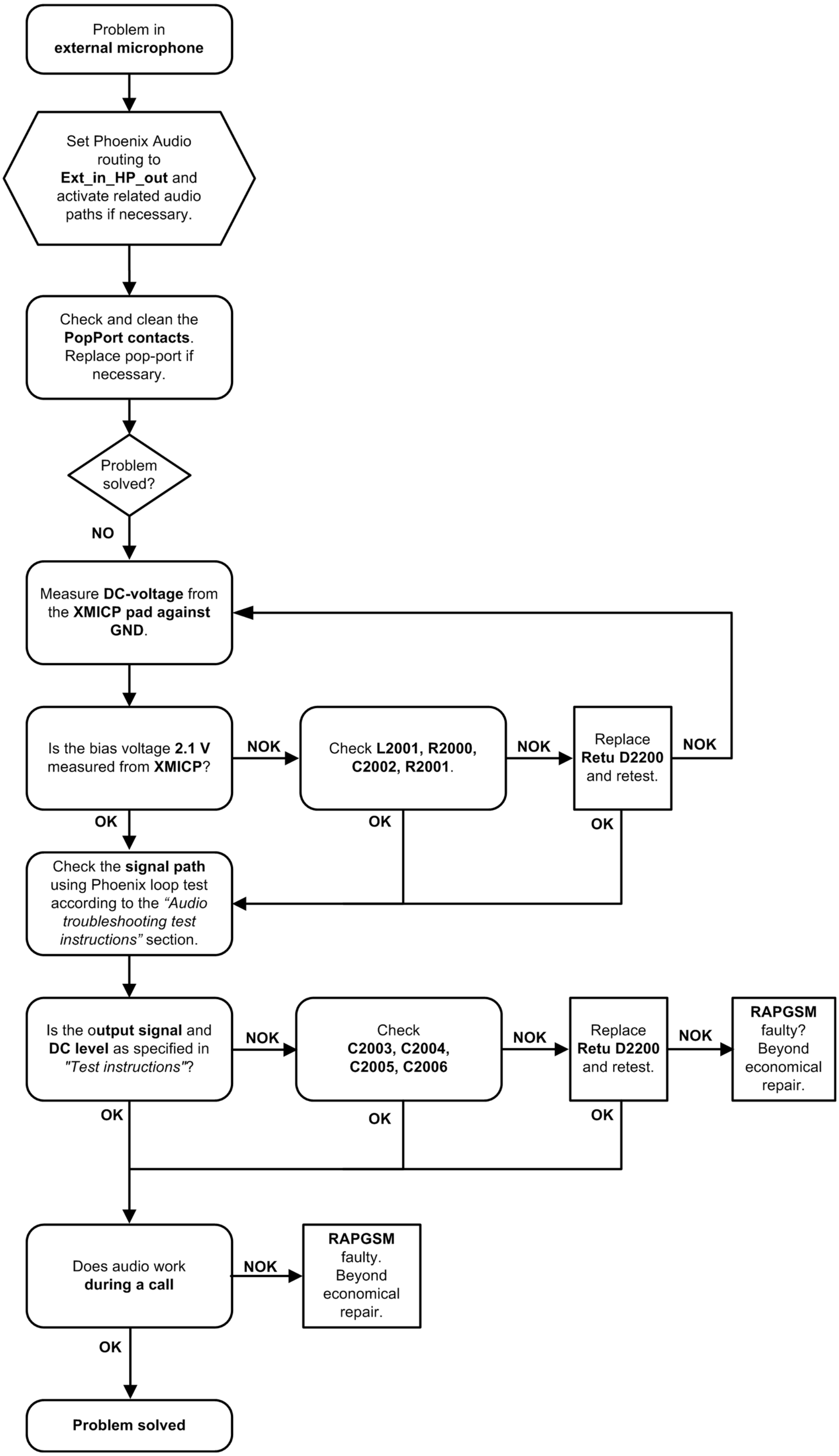
Internal microphone troubleshooting

Troubleshooting flow


Problem in the **internal microphone**
Set Phoenix audio routing to **HP_in_Ext_out** mode and activate related audio paths if necessary.
Check the microphone module and clean the PWB pads following the acoustics troubleshooting flowchart.
Problem solved?
YES
NO
Measure **DC-voltage** from the **microphone** pads against GND.
Is the bias voltage **2.1V** measured from **R2101**?
NO
Check **R2101** & **C2102** and replace if necessary. Retest.
Bias voltage OK?
NO
Change **Retu**. Retest.
Bias voltage not ok.
YES
RAPGSM faulty?
YES
Beyond economical repair
YES
Check the **signal path** using Phoenix loop test according to the *“Audio troubleshooting test instructions”* section.
Is the **output signal level** and **DC level** as specified in *“Test instructions”*
NO
Check **R2100, C2100, C2101** and replace if necessary. Retest.
Levels OK?
NO
Change **Retu.** Retest.
Levels OK?
NO
RAPGSM faulty?
YES
YES
YES
YES
Does audio work during a call
NO
RAPGSM faulty?
YES
Beyond economical repair
YES
PROBLEM SOLVED

External headset microphone troubleshooting

Troubleshooting flow


Problem in **external microphone**
Set Phoenix Audio routing to **Ext_in_HP_out** and activate related audio paths if necessary.
Check and clean the **PopPort contacts**. Replace pop-port if necessary.
Problem solved?
NO
Measure **DC-voltage** from the **XMICP pad against GND**.
Is the bias voltage **2.1 V** measured from **XMICP**?
NOK
Check **L2001, R2000, C2002, R2001**.
NOK
Replace **Retu D2200** and retest.
NOK
OK
OK
OK
Check the **signal path** using Phoenix loop test according to the *"Audio troubleshooting test instructions"* section.
Is the **output signal** and **DC level** as specified in *"Test instructions"*?
NOK
Check **C2003, C2004, C2005, C2006**
NOK
Replace **Retu D2200** and retest.
NOK
RAPGSM faulty? Beyond economical repair.
OK
OK
OK
Does audio work **during a call**
NOK
RAPGSM faulty. Beyond economical repair.
OK
Problem solved

Connections troubleshooting

Bluetooth troubleshooting

Introduction to Bluetooth troubleshooting

There are two main Bluetooth (BT) problems that can occur:

Problem	Description
Detachment of the BT antenna.	This would most likely happen if the device has been dropped repeatedly to the ground. It could cause the BT antenna to become loose or partially detached from the PWB.
A malfunction in the BT ASIC, BB ASICs or the phone's BT SMD components.	This is unpredictable and could have many causes i.e. SW or HW related.

The main issue is to find out if the problem is related to the BT antenna or related to the BT system or the phone's BB and then replace/fix the faulty component. For location of the antenna, please refer to the exploded view in the Parts and layouts section.

Bluetooth settings for Phoenix

Steps

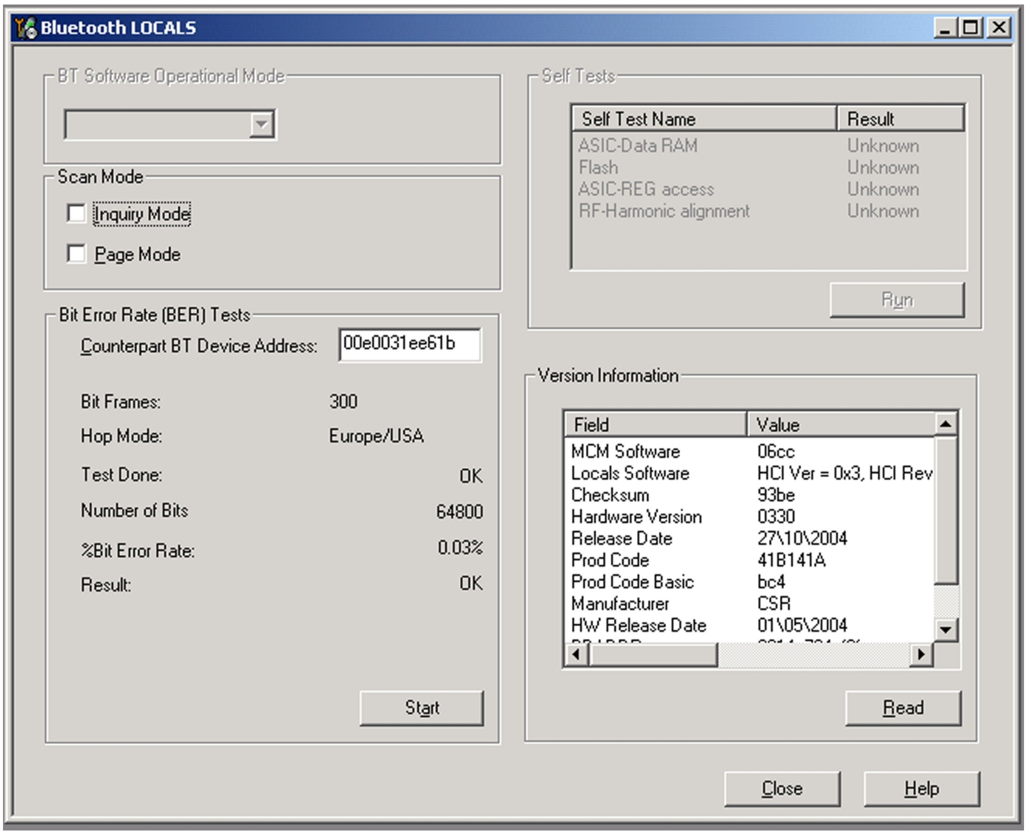
1. Start *Phoenix* service software.
2. From the **File** menu, choose **Open Product**, and then choose the correct type designator from the **Product** list.
3. Place the phone to a flash adapter in the local mode.
4. Choose **Testing→Bluetooth LOCALS** .
5. Locate JBT-9's serial number (12 digits) found in the type label on the back of JBT-9.

   In addition to JBT-9, also SB-6, JBT-3 and JBT-6 Bluetooth test boxes can be used.
6. In the *Bluetooth LOCALS* window, write the 12-digit serial number on the **Counterpart BT Device Address** line.

   This needs to be done only once provided that JBT-9 is not changed.
7. Place the JBT-9 box near (within 10 cm) the BT antenna and click **Run BER Test**.

Results

Bit Error Rate test result is displayed in the *Bit Error Rate (BER) Tests* pane in the *Bluetooth LOCALS* window.


Bluetooth LOCALS
BT Software Operational Mode
Scan Mode
Bit Error Rate (BER) Tests
Self Tests
Version Information
Run
Start
Read
Close
Help

☐ Inquiry Mode
☐ Page Mode

Counterpart BT Device Address: 00e0031ee61b
Bit Frames: 300
Hop Mode: Europe/USA
Test Done: OK
Number of Bits 64800
%Bit Error Rate: 0.03%
Result: OK

Self Test Name	Result
ASIC-Data RAM	Unknown
Flash	Unknown
ASIC-REG access	Unknown
RF-Harmonic alignment	Unknown

Field	Value
MCM Software	06cc
Locals Software	HCI Ver = 0x3, HCI Rev
Checksum	93be
Hardware Version	0330
Release Date	27\10\2004
Prod Code	41B141A
Prod Code Basic	bc4
Manufacturer	CSR
HW Release Date	01\05\2004

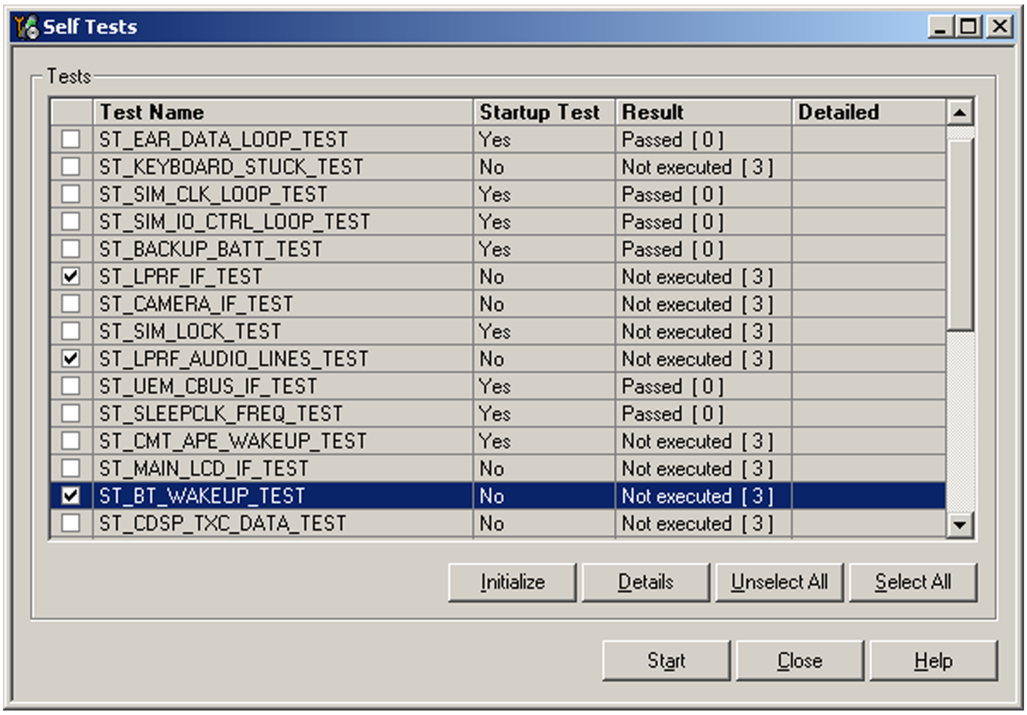
Figure 48 BER test result

Bluetooth self tests in Phoenix

Steps

1. Start *Phoenix* service software.
2. Choose**File**→**Scan Product.**
3. Place the phone to a flash adapter.
4. From the **Mode** drop-down menu, set mode to **Local**.
5. Choose **Testing**→**Self Tests.**
6. In the *Self Tests* window check the following Bluetooth related tests:
    - **ST_LPRF_IF_TEST**
    - **ST_LPRF_AUDIO_LINES_TEST**
    - **ST_BT_WAKEUP_TEST**

7. To run the tests, click **Start**.



	Test Name	Startup Test	Result	Detailed
☐	ST_EAR_DATA_LOOP_TEST	Yes	Passed [0]	
☐	ST_KEYBOARD_STUCK_TEST	No	Not executed [3]	
☐	ST_SIM_CLK_LOOP_TEST	Yes	Passed [0]	
☐	ST_SIM_IO_CTRL_LOOP_TEST	Yes	Passed [0]	
☐	ST_BACKUP_BATT_TEST	Yes	Passed [0]	
☑	ST_LPRF_IF_TEST	No	Not executed [3]	
☐	ST_CAMERA_IF_TEST	No	Not executed [3]	
☐	ST_SIM_LOCK_TEST	Yes	Not executed [3]	
☑	ST_LPRF_AUDIO_LINES_TEST	No	Not executed [3]	
☐	ST_UEM_CBUS_IF_TEST	Yes	Passed [0]	
☐	ST_SLEEPCLK_FREQ_TEST	Yes	Passed [0]	
☐	ST_CMT_APE_WAKEUP_TEST	Yes	Not executed [3]	
☐	ST_MAIN_LCD_IF_TEST	No	Not executed [3]	
☑	ST_BT_WAKEUP_TEST	No	Not executed [3]	
☐	ST_CDSP_TXC_DATA_TEST	No	Not executed [3]	

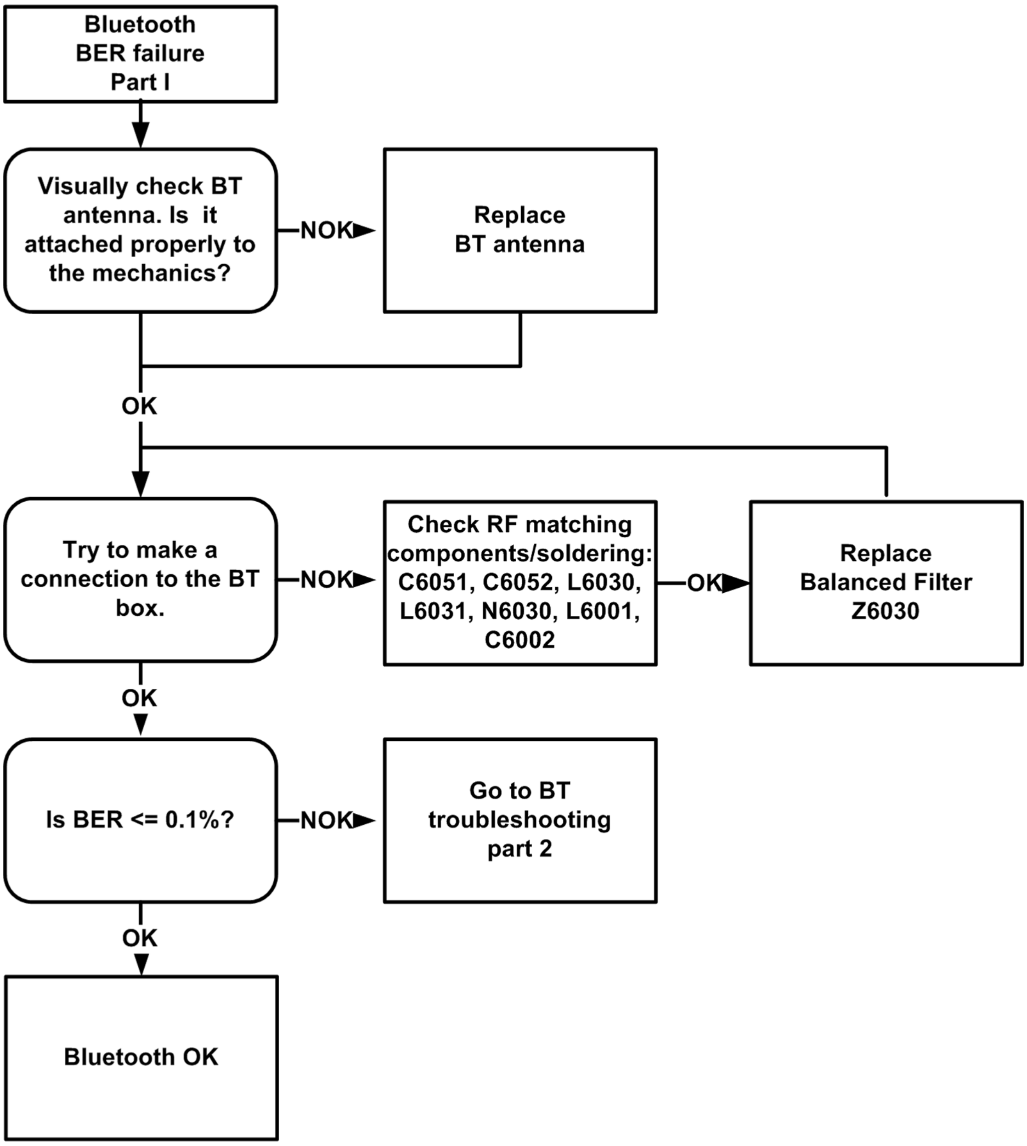
Figure 49 Bluetooth self tests in *Phoenix*

Bluetooth BER failure troubleshooting

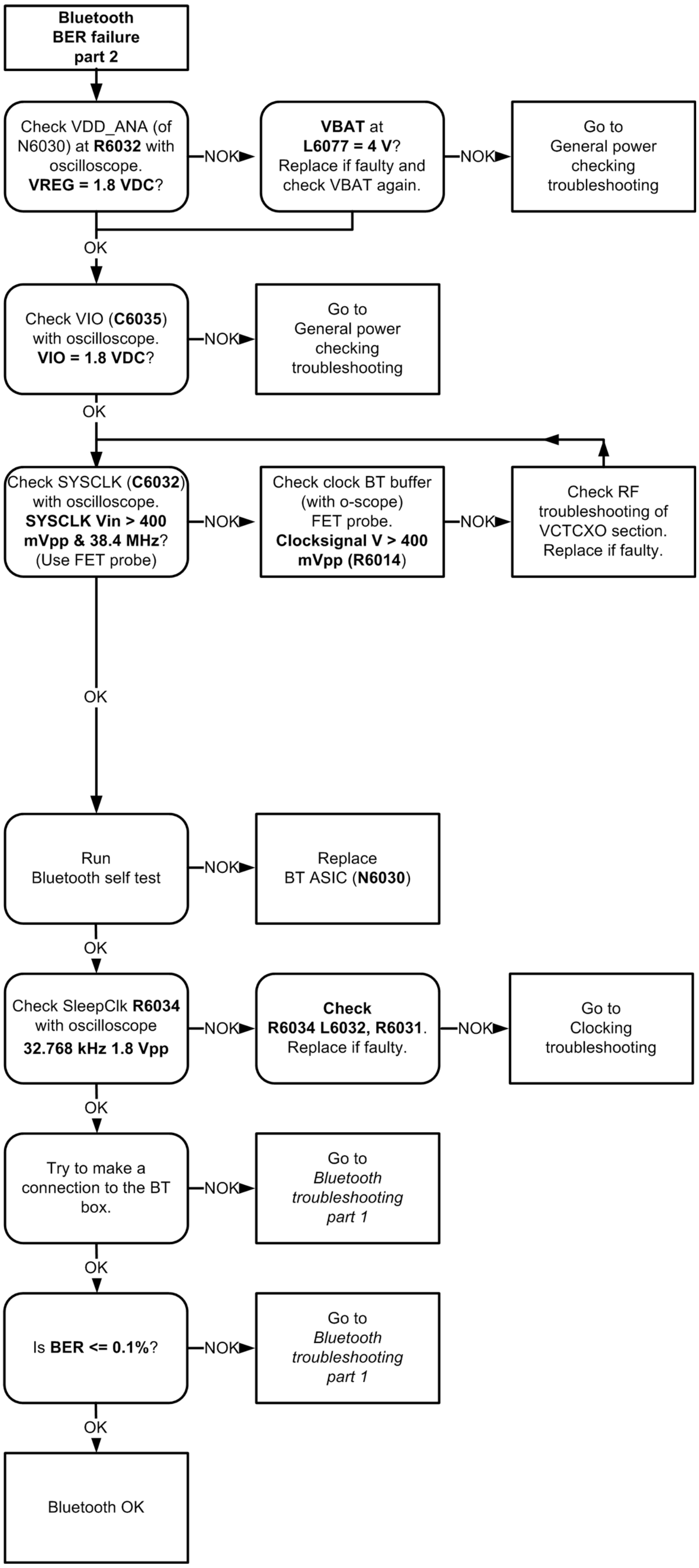
Context

Basic encoding rules, BER, is a self-identifying and self-delimiting encoding scheme, which means that each data value can be identified, extracted and decoded individually.

Part 1: Bluetooth self test passed but BER test failed

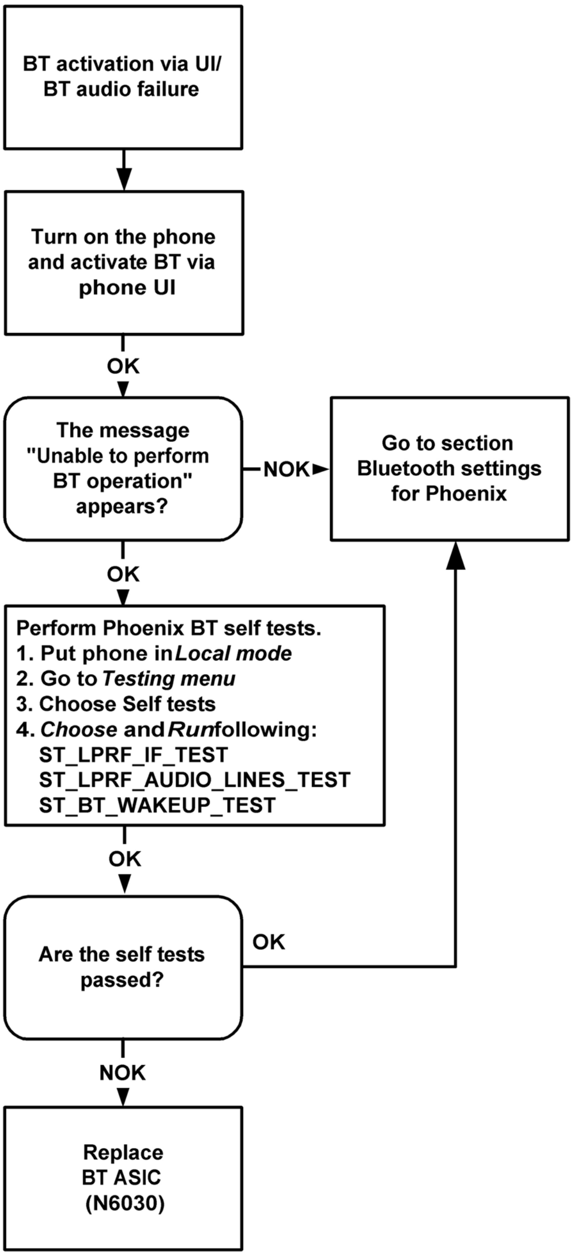

Bluetooth BER failure Part I
Visually check BT antenna. Is it attached properly to the mechanics?
NOK
Replace BT antenna
OK
Try to make a connection to the BT box.
NOK
Check RF matching components/soldering: C6051, C6052, L6030, L6031, N6030, L6001, C6002
OK
Replace Balanced Filter Z6030
OK
Is BER <= 0.1%?
NOK
Go to BT troubleshooting part 2
OK
Bluetooth OK

Part 2: Bluetooth self test failed


Bluetooth BER failure part 2
Check VDD_ANA (of N6030) at R6032 with oscilloscope. VREG = 1.8 VDC?
NOK
VBAT at L6077 = 4 V? Replace if faulty and check VBAT again.
NOK
Go to General power checking troubleshooting
OK
Check VIO (C6035) with oscilloscope. VIO = 1.8 VDC?
NOK
Go to General power checking troubleshooting
OK
Check SYSCLK (C6032) with oscilloscope. SYSCLK Vin > 400 mVpp & 38.4 MHz? (Use FET probe)
NOK
Check clock BT buffer (with o-scope) FET probe. Clocksignal V > 400 mVpp (R6014)
NOK
Check RF troubleshooting of VCTCXO section. Replace if faulty.
OK
Run Bluetooth self test
NOK
Replace BT ASIC (N6030)
OK
Check SleepClk R6034 with oscilloscope 32.768 kHz 1.8 Vpp
NOK
Check R6034 L6032, R6031. Replace if faulty.
NOK
Go to Clocking troubleshooting
OK
Try to make a connection to the BT box.
NOK
Go to Bluetooth troubleshooting part 1
OK
Is BER <= 0.1%?
NOK
Go to Bluetooth troubleshooting part 1
OK
Bluetooth OK

Bluetooth audio and UI activation troubleshooting

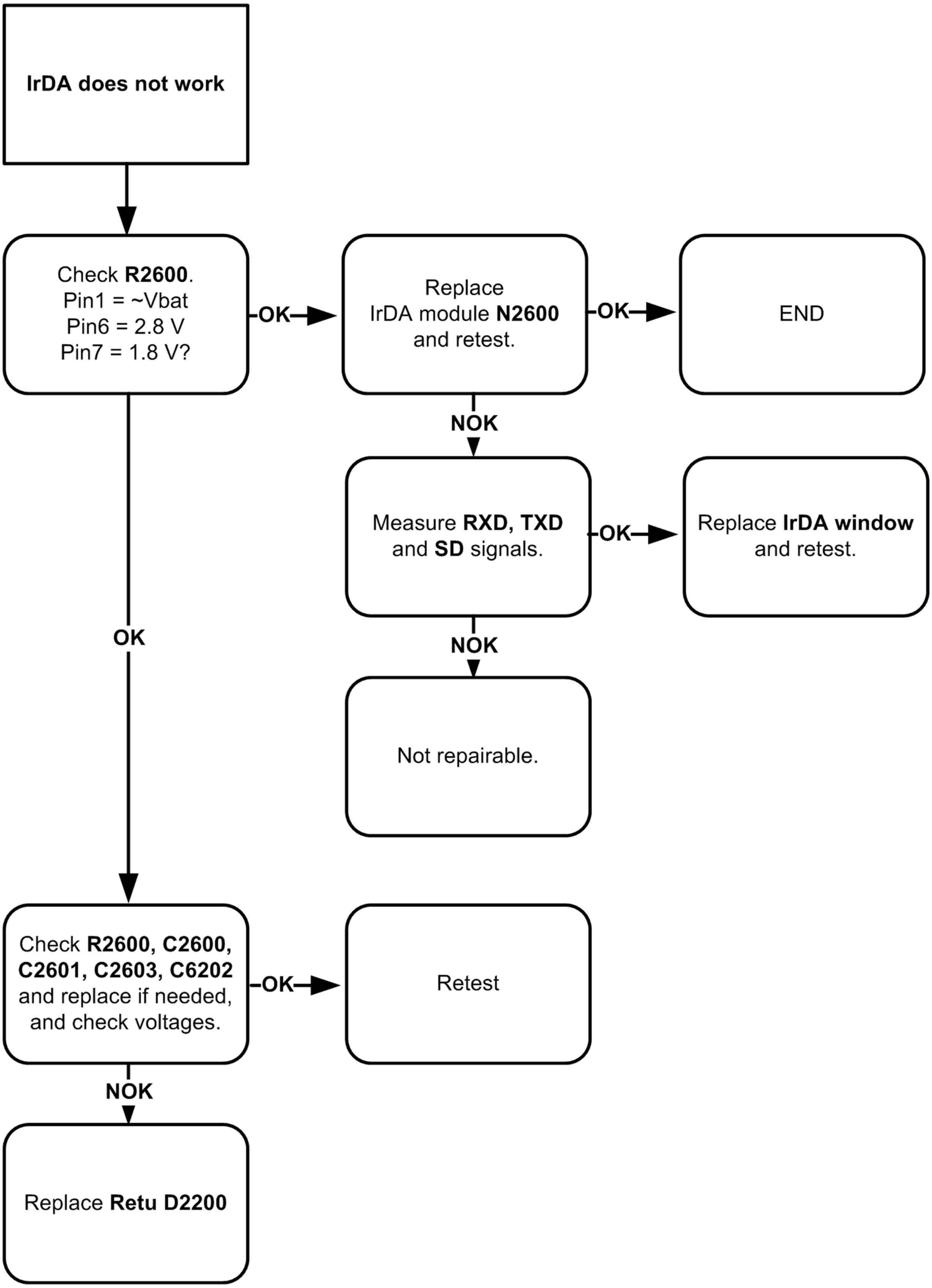
Troubleshooting flow


BT activation via UI/ BT audio failure
Turn on the phone and activate BT via phone UI
OK
The message "Unable to perform BT operation" appears?
NOK
Go to section Bluetooth settings for Phoenix
OK
Perform Phoenix BT self tests.
1. Put phone in *Local mode*
2. Go to *Testing menu*
3. Choose Self tests
4. *Choose* and *Run* following:
ST_LPRF_IF_TEST
ST_LPRF_AUDIO_LINES_TEST
ST_BT_WAKEUP_TEST
OK
Are the self tests passed?
OK
NOK
Replace BT ASIC (N6030)

IrDA troubleshooting

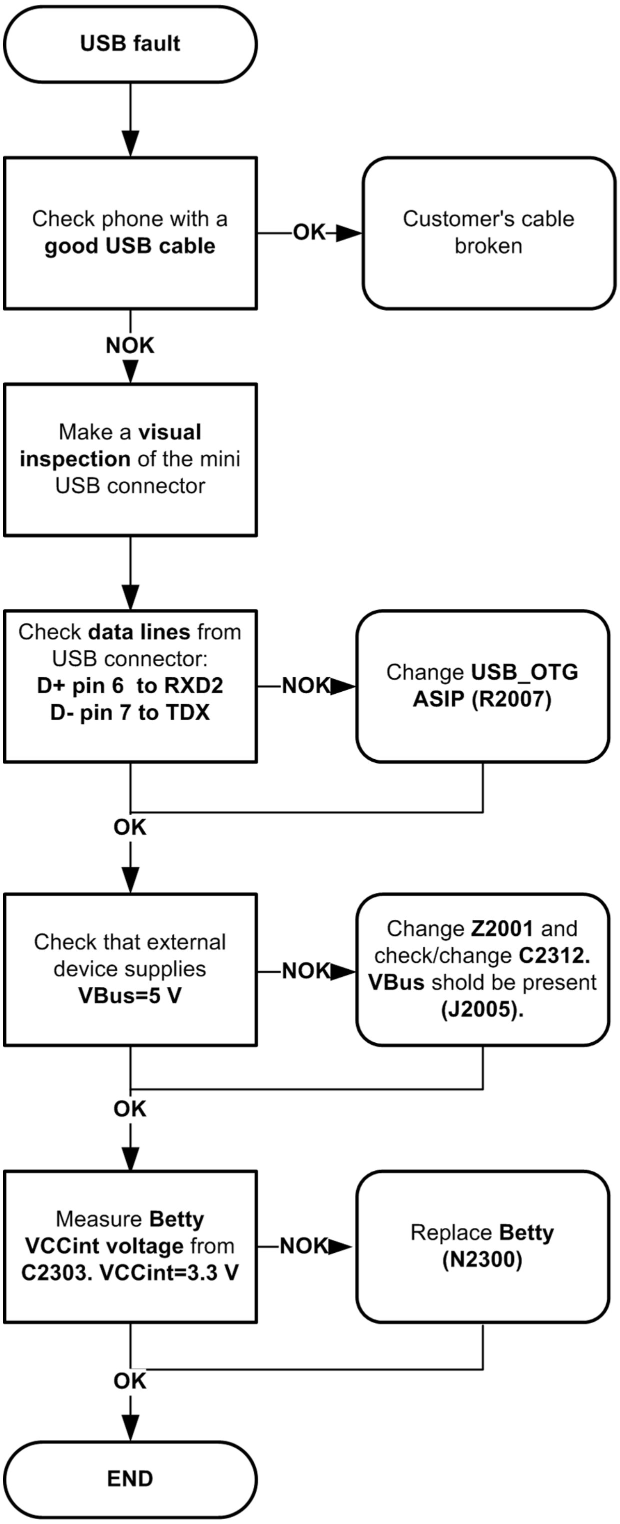
Troubleshooting flow

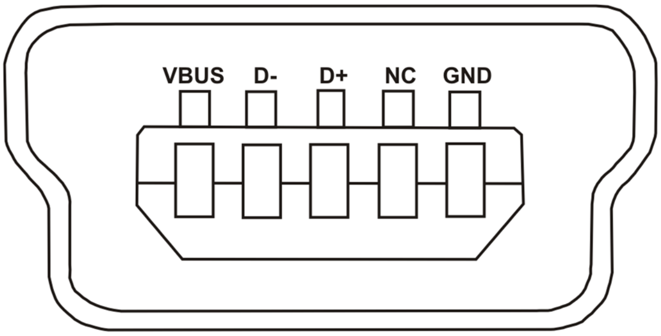
Note: IrDA is not supported by all variants!


IrDA does not work
Check R2600.
Pin1 = ~Vbat
Pin6 = 2.8 V
Pin7 = 1.8 V?
OK
Replace
IrDA module N2600
and retest.
OK
END
NOK
Measure RXD, TXD
and SD signals.
OK
Replace IrDA window
and retest.
NOK
Not repairable.
OK
Check R2600, C2600,
C2601, C2603, C6202
and replace if needed,
and check voltages.
OK
Retest
NOK
Replace Retu D2200

USB interface troubleshooting

Troubleshooting flow


USB fault
Check phone with a good USB cable
OK
Customer's cable broken
NOK
Make a visual inspection of the mini USB connector
Check data lines from USB connector: D+ pin 6 to RXD2 D- pin 7 to TDX
NOK
Change USB_OTG ASIP (R2007)
OK
Check that external device supplies VBus=5 V
NOK
Change Z2001 and check/change C2312. VBus shold be present (J2005).
OK
Measure Betty VCCint voltage from C2303. VCCint=3.3 V
NOK
Replace Betty (N2300)
OK
END


VBUS
D-
D+
NC
GND

Baseband manual tuning guide

Certificate restoring for BB5 products

Context

This procedure is performed when the device certificate is corrupted for some reason.

All tunings (RF & Baseband, UI) must be done after performing the certificate restoring procedure.

The procedure for certificate restoring is the following:

- Flash the phone with the latest available software using FPS-8 or FPS-10.

  Note: USB flashing does not work for a dead BB5 phone.

- Create a request file.
- Send the file to Nokia by e-mail. Use the following addresses depending on your location:
  - APAC: sydney.service@nokia.com
  - CHINA: repair.ams@nokia.com
  - E&A: salo.repair@nokia.com
  - AMERICAS: fls1.usa@nokia.com
- When you receive a reply from Nokia, carry out certificate restoring.
- Tune the phone completely.

  Note: SX-4 smart card is needed.

- If the phone resets after certificate restoring, reflash the phone again.

Required equipment and setup:

- *Phoenix* service software v 2004.39.7.70 or newer.
- The latest phone model specific *Phoenix* data package.
- PKD-1 dongle
- SX-4 smart card (Enables BB5 testing and tuning features)
- External smart card reader

  Note: The smart card reader is only needed when FPS-8 is used. FPS-10 has an integrated smart card reader.

- Activated FPS-8 flash prommer **OR** FPS-10 flash prommer
- Flash update package 03.18.004 or newer for FPS-8 or FPS-10 flash prommers
- CU-4 control unit
- USB cable from PC USB Port to CU-4 control unit
- Phone model specific adapter for CU-4 control unit
- PCS-1 cable to power CU-4 from external power supply
- XCS-4 modular cable between flash prommer and CU-4

  Note: CU-4 must be supplied with +12 V from an external power supply in all steps of certificate restoring.

Steps

1. Program the phone software.

   i Start *Phoenix* and login. Make sure the connection has been managed correctly for FPS-8 or FPS-10.

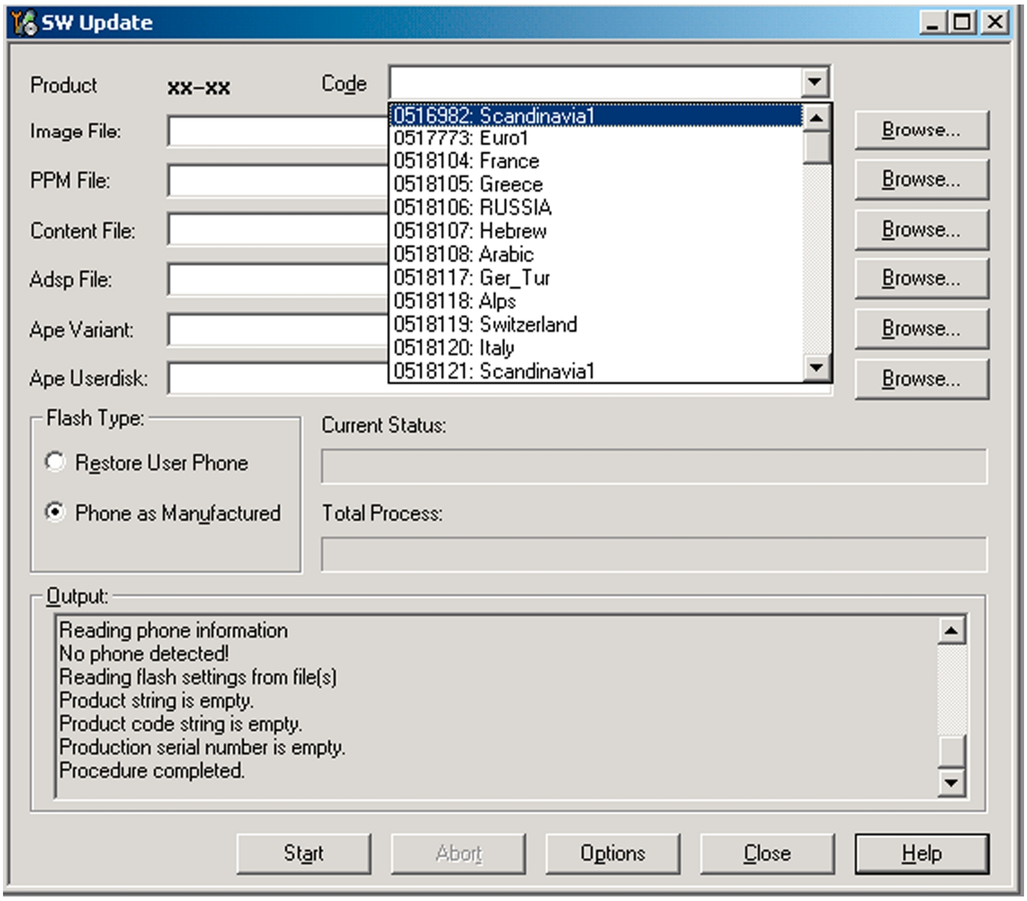
ii Update the phone MCU software to the latest available version.

If the new flash is empty and the phone cannot communicate with *Phoenix*, reflash the phone.

iii Choose the product manually from **File→Open Product** , and click **OK**.

Wait for the phone type designator (e.g. "RM-1") to be displayed in the status bar.

iv Go to **Flashing→SW Update** and wait until *Phoenix* reads the product data as shown in the following picture.


SW Update
Code
Image File:
PPM File:
Content File:
Adsp File:
Ape Variant:
Ape Userdisk:
Browse...
Browse...
Browse...
Browse...
Browse...
Browse...
Current Status:
Total Process:
Output:
Start
Abort
Options
Close
Help

Product xx-xx

0516982: Scandinavia1
0517773: Euro1
0518104: France
0518105: Greece
0518106: RUSSIA
0518107: Hebrew
0518108: Arabic
0518117: Ger_Tur
0518118: Alps
0518119: Switzerland
0518120: Italy
0518121: Scandinavia1

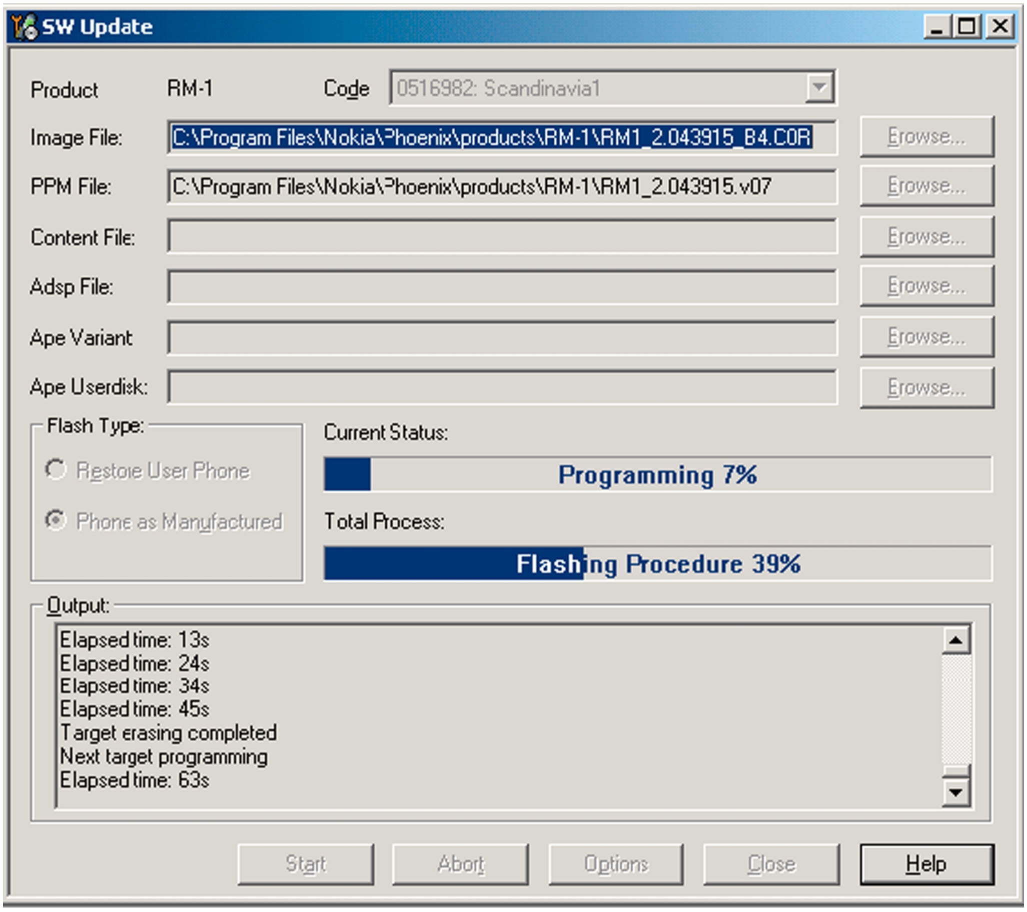
Flash Type:
○ Restore User Phone
● Phone as Manufactured

```
Reading phone information
No phone detected!
Reading flash settings from file(s)
Product string is empty.
Product code string is empty.
Production serial number is empty.
Procedure completed.
```

Product	is automatically set according to the phone support module which was opened manually, but the flash files cannot be found because the correct data cannot be read from the phone automatically.
Code	must be chosen manually, it determines the correct flash files to be used. Please choose the correct product code (can be seen in the phone type label) from the dropdown list.
Flash Type	must be set to **Phone as Manufactured**.

v To continue, click **Start**.

Progress bars and messages on the screen show actions during phone programming, please wait.


SW Update
Browse...
Browse...
Browse...
Browse...
Browse...
Browse...
Start
Abort
Options
Close
Help

Product: RM-1
Code: 0516982: Scandinavia1
Image File: C:\Program Files\Nokia\Phoenix\products\RM-1\RM1_2.043915_B4.C0R
PPM File: C:\Program Files\Nokia\Phoenix\products\RM-1\RM1_2.043915.v07
Content File:
Adsp File:
Ape Variant
Ape Userdisk:

Flash Type:
○ Restore User Phone
● Phone as Manufactured

Current Status: Programming 7%
Total Process: Flashing Procedure 39%

Output:

```
Elapsed time: 13s
Elapsed time: 24s
Elapsed time: 34s
Elapsed time: 45s
Target erasing completed
Next target programming
Elapsed time: 63s
```

Programming is completed when *Flashing Completed* message is displayed.

The product type designator and MCU SW version are displayed in the status bar.

vi Close the *SW Update* window and then choose **File→Close Product** .

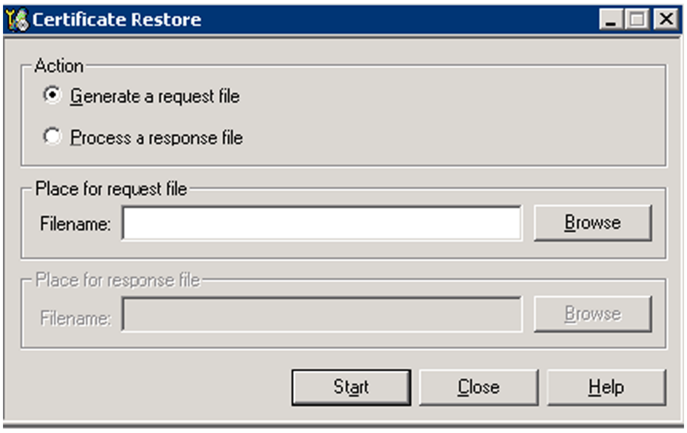
2. Create a *Request* file.

For this procedure, you must supply +12 V to CU-4 from an external power supply.

i To connect the phone with *Phoenix*, choose **File→Scan Product** .

ii Choose **Tools→Certificate Restore** .

iii To choose a location for the request file, click **Browse**.

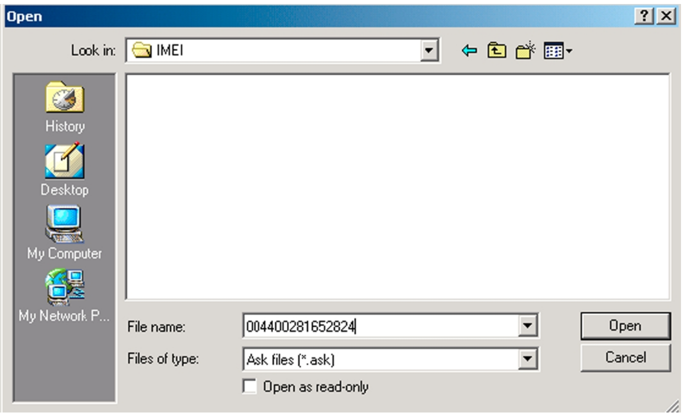

Certificate Restore
Browse
Browse
Start
Close
Help

Action
● Generate a request file
○ Process a response file

Place for request file
Filename:

Place for response file
Filename:

iv Name the file so that you can easily identify it, and click **Open**.



Look in: IMEI

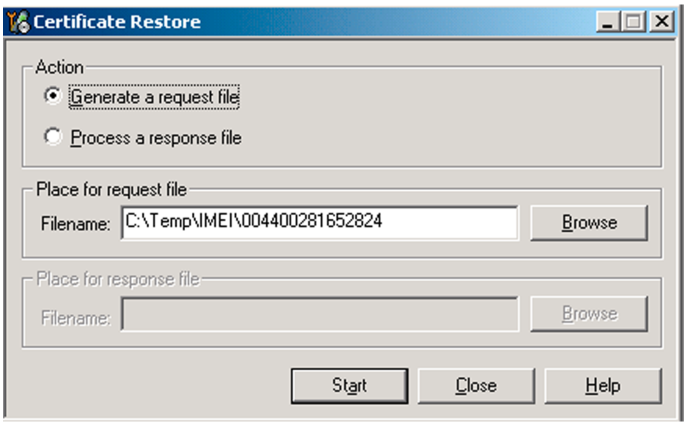
File name: 004400281652824

Files of type: Ask files (*.ask)

☐ Open as read-only

Open
History
Desktop
My Computer
My Network P...
Open
Cancel

The name of the file and its location are shown.



Action

● Generate a request file

○ Process a response file

Place for request file

Filename: C:\Temp\IMEI\004400281652824

Place for response file

Filename:

Certificate Restore
Browse
Browse
Start
Close
Help

v To create the *Request* file, click **Start**.

vi When the file for certificate restore has been created, send it to Nokia as an e-mail attachment.

3. Restore certificate.

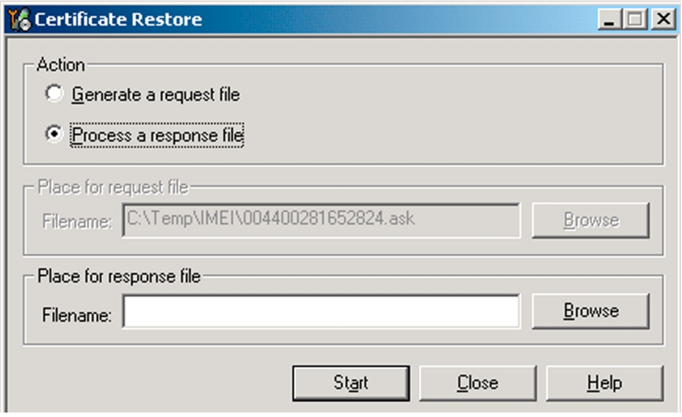
For this procedure, you must supply +12 V to CU-4 from an external power supply.

i Save the reply file sent by Nokia to your computer.

ii Start *Phoenix* service software.

iii Choose **File→Scan Product** .

iv From the **Tools** menu, choose **Certificate Restore** and select **Process a response file** in the *Action* pane.


Certificate Restore
Action
Place for request file
Browse
Place for response file
Browse
Start
Close
Help

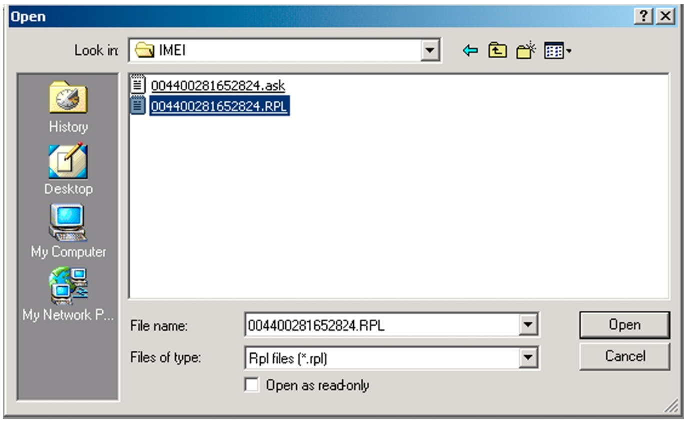
○ Generate a request file
● Process a response file

Filename: C:\Temp\IMEI\004400281652824.ask

Filename:

v To choose the location where response file is saved, click **Browse**.

vi Click **Open**.


Open
History
Desktop
My Computer
My Network P...
Open
Cancel

Look in: IMEI

004400281652824.ask
004400281652824.RPL

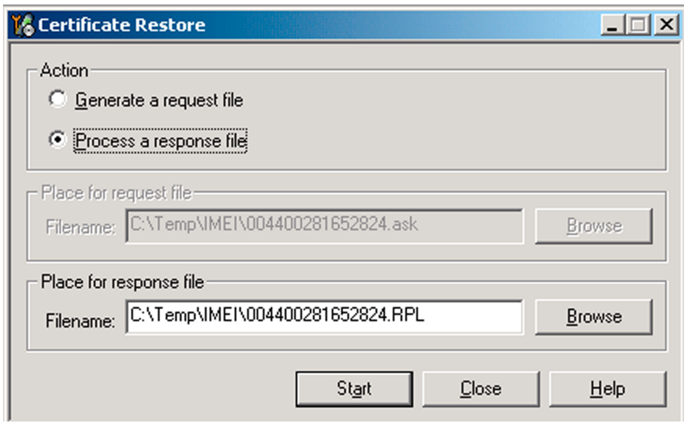
File name: 004400281652824.RPL

Files of type: Rpl files (*.rpl)

☐ Open as read-only

The name of the file and the path where it is located are shown.

vii To write the file to phone, click **Start**.


Certificate Restore
Action
Place for request file
Browse
Place for response file
Browse
Start
Close
Help

○ Generate a request file
● Process a response file

Filename: C:\Temp\IMEI\004400281652824.ask

Filename: C:\Temp\IMEI\004400281652824.RPL

Next actions

After a successful rewrite, you must retune the phone completely by using *Phoenix* tuning functions.

Important: Perform all tunings: RF, BB, and UI.

Energy management calibration

Prerequisites

Energy Management (EM) calibration is performed to calibrate the setting (gain and offset) of AD converters in several channels (that is, **battery voltage**, **BSI**, **battery current**) to get an accurate AD conversion result.

Hardware setup:

- An external power supply is needed.
- Supply 12V DC from an external power supply to CU-4 to power up the phone.
- The phone must be connected to a CU-4 control unit with a product-specific flash adapter.

Steps

1. Place the phone to the docking station adapter (CU-4 is connected to the adapter).
2. Start *Phoenix* service software.
3. Choose **File**→ **Scan Product.**
4. Choose **Tuning**→**Energy Management Calibration.**
5. To show the current values in the phone memory, click **Read**, and check that communication between the phone and CU-4 works.
6. Check that the **CU-4 used** check box is checked.
7. Select the item(s) to be calibrated.

   Note: ADC calibration has to be performed before other item(s). However, if all calibrations are selected at the same time, there is no need to perform the ADC calibration first.
8. Click **Calibrate**.

   The calibration of the selected item(s) is carried out automatically.

   The candidates for the new calibration values are shown in the *Calculated values* column. If the new calibration values seem to be acceptable (please refer to the following "Calibration value limits" table), click **Write** to store the new calibration values to the phone permanent memory.

Table 15 Calibration value limits

Parameter	Min.	Max.
ADC Offset	-20	20
ADC Gain	12000	14000
BSI Gain	1100	1300
VBAT Offset	2400	2650
VBAT Gain	19000	23000
VCHAR Gain	N/A	N/A
IBAT (ICal) Gain	7750	12250

9. Click **Read**, and confirm that the new calibration values are stored in the phone memory correctly. If the values are not stored to the phone memory, click **Write** and/or repeat the procedure again.
10. To end the procedure, close the *Energy Management Calibration* window.

7 — RF Troubleshooting and Manual Tuning Guide

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Introduction to RF troubleshooting

On the following pages you will find a step-by-step troubleshooting procedure and reference measurements at the relevant signal points. For functional descriptions, please refer to the System module section.

Notes on reference measurements

All measurements must be done using:

- spectrum analyser with a high-frequency high-impedance passive probe (LO-/reference frequencies and RF power levels)
- oscilloscope with a 10:1 probe (DC-voltages and low frequency signals)

> **Important:** All measurements with an RF coupler must be performed in an RF shielded environment, or where there are no transmissions on the same frequencies. This may disturb sensitive receiver measurements.

Repairing this phone - important

The RF section of the phone is built around one RF ASIC. Before changing the RF ASIC, please make sure that supply voltages and serial communication coming from baseband to RF are OK.

Please note that the grounding of the FEM module is directly below the FEM module. Therefore, it is difficult to check or change the module.

Most RF semiconductors are static discharge sensitive! ESD protection must be taken care of during repair (ground straps and ESD soldering irons). The RF ASIC and FEM are moisture sensitive, so parts must be pre-baked prior to soldering.

In addition to key components, there are lot of discrete components (resistors, inductors and capacitors) which troubleshooting is done mainly by checking if the soldering of the component is done properly.

Capacitor can be checked for shorts and resistors for value by means of an ohmmeter, but be aware in-circuit measurements should be evaluated carefully.

Keep in mind that all measured voltages or RF levels depicted in the service manual are rough figures. Especially RF levels vary because of different measuring equipment or different grounding of the probe used.

When using an RF probe, use a pair of metallic tweezers to connect the probe ground to the PWB ground as close to the measurement point as possible. If measurements are performed in a product specific module jig, then "GND" pads should be used for the probe ground.

RF key components

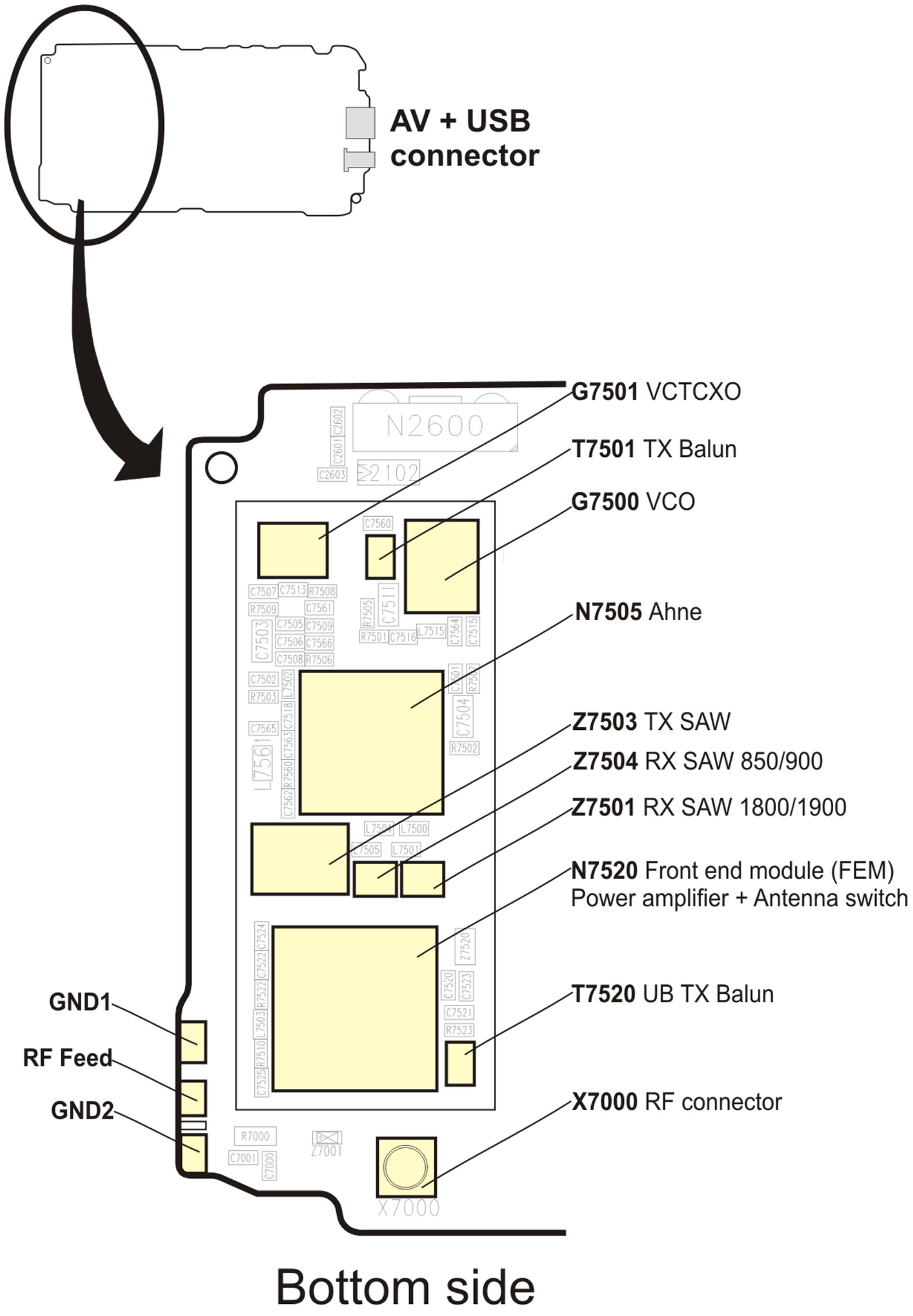

AV + USB connector
G7501 VCTCXO
T7501 TX Balun
G7500 VCO
N7505 Ahne
Z7503 TX SAW
Z7504 RX SAW 850/900
Z7501 RX SAW 1800/1900
N7520 Front end module (FEM)
Power amplifier + Antenna switch
T7520 UB TX Balun
X7000 RF connector
GND1
RF Feed
GND2
N2600
Bottom side

Figure 50 RF key components, bottom side main board

Receiver troubleshooting

Introduction to RX troubleshooting

Rx can be tested by making a phone call or in the local mode. For the local mode testing, use Phoenix service software.

The main Rx troubleshooting measurement is RSSI measurement. This test measures the signal strength of the received signal. I and Q branches can be measured separately.

In GSM, the input signal can be either a real GSM signal or a CW signal that is 67.771kHz up from the carrier frequency.

For service tool usage instructions, refer to section Service Tools and Service Concepts.

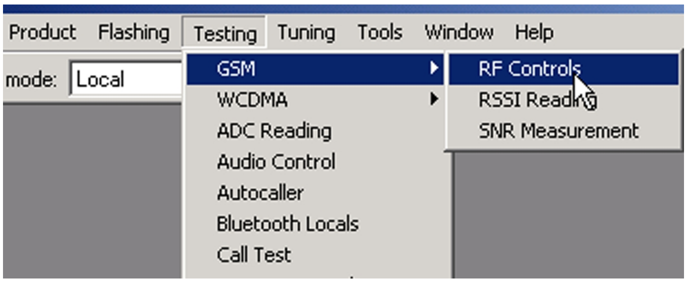
General instructions for RX troubleshooting

Steps

1. Connect a test jig to a computer with a DAU-9S cable or to a FPS-10 flash prommer with a modular cable (XCS-4).

   Make sure that you have a PKD-1 dongle connected to the computer's parallel port.
2. Connect CU-4 with 12 V supply. The DC supply voltage is set to 3.7 V by default (in Phoenix).
3. Connect an RF cable between the RF connector of the module test jig (MJ-92) and measurement equipment or alternatively use a 50 Ω (at least 2 W) dummy load in the module test jig RF connector, otherwise the RF part may be damaged.

   Note: Make sure that all connections are made to the correct RF connector.
4. Set Rx on.
   - i Set the phone module to the test jig and start *Phoenix service software*.
   - ii Initialize connection to the phone. (With the FPS-10 prommer use FPS10_USB or FPS10_TCP drivers, depending on connection type. When using DAU-9S select FBUS).
   - iii From the File menu, choose product: **File -> Choose Product -> xx-x*** (* = type designator of the phone, eg. RM-146/147), or press **Ctrl + R** to scan product.
   - iv From the toolbar, set operating mode to “Local”.
5. EGSM850/900/1800/1900 troubleshooting
   - i From the Testing menu, activate the *RF Controls* window: **Testing -> GSM -> RF Controls** .

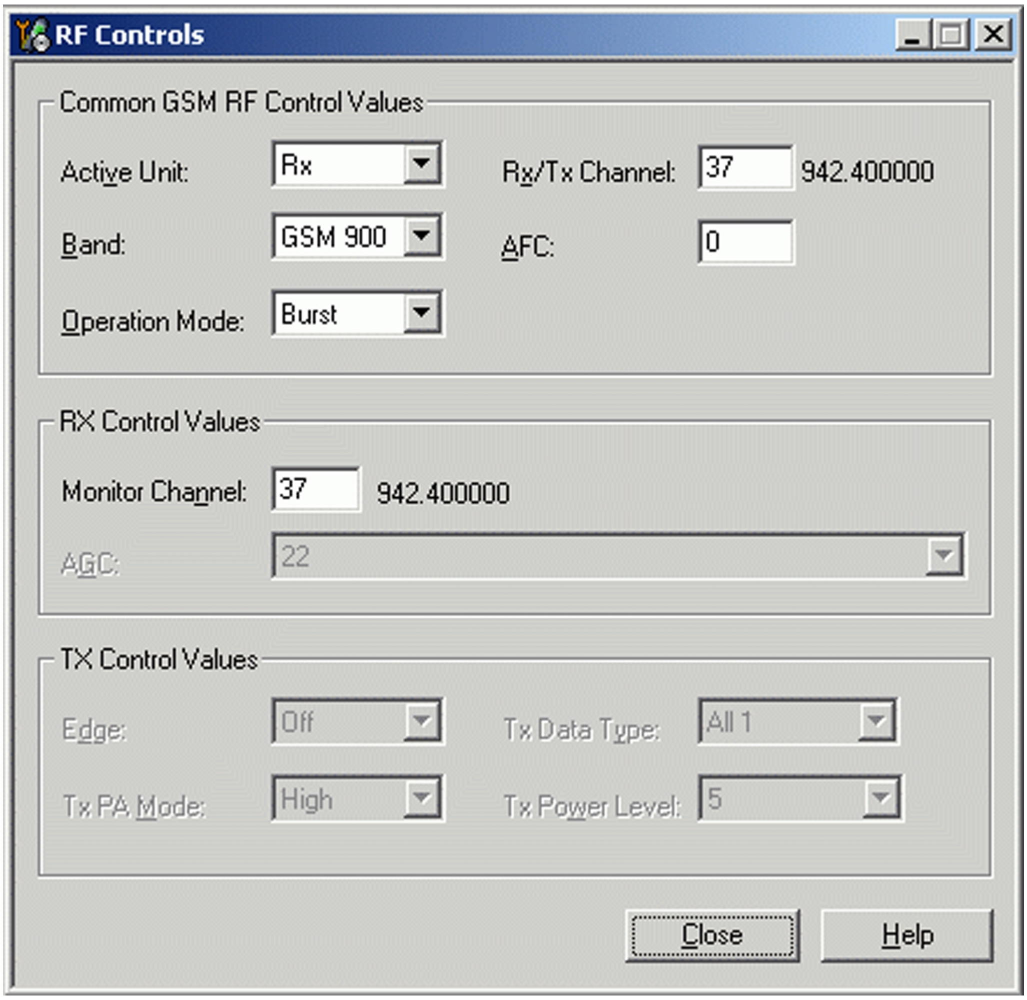


   - ii In the *RF Controls* window:
     - Select band (Default = “GSM850”).
     - Set Active unit to “Rx” (Default).
     - Set Operation mode to “Burst” (Default).
     - Set Rx/Tx channel (see table below).
     - Apply a frequency (see table below) to the RF-connector.

     Note: Remember to compensate for cable attenuation, specific for MJ-92. You will find the values in the Service tools section.

     Apply a signal to the RF-connector (remember to compensate for cable attenuation). See values in the table below.

Band	Channel (RX and TX)	Input frequency (MHz)	Offset (kHz)	Power level (dBm)
GSM850	190	881.66771	67.710	-90
GSM900	37	942.46771	67.710	-90
GSM1800	700	1842.86771	67.710	-90
GSM1900	661	1960.06771	67.710	-90


RF Controls

Common GSM RF Control Values

Active Unit: Rx

Rx/Tx Channel: 37 942.400000

Band: GSM 900

AFC: 0

Operation Mode: Burst

RX Control Values

Monitor Channel: 37 942.400000

AGC: 22

TX Control Values

Edge: Off

Tx Data Type: All 1

Tx PA Mode: High

Tx Power Level: 5

Figure 51 RF Controls window

Receiver (RX) troubleshooting

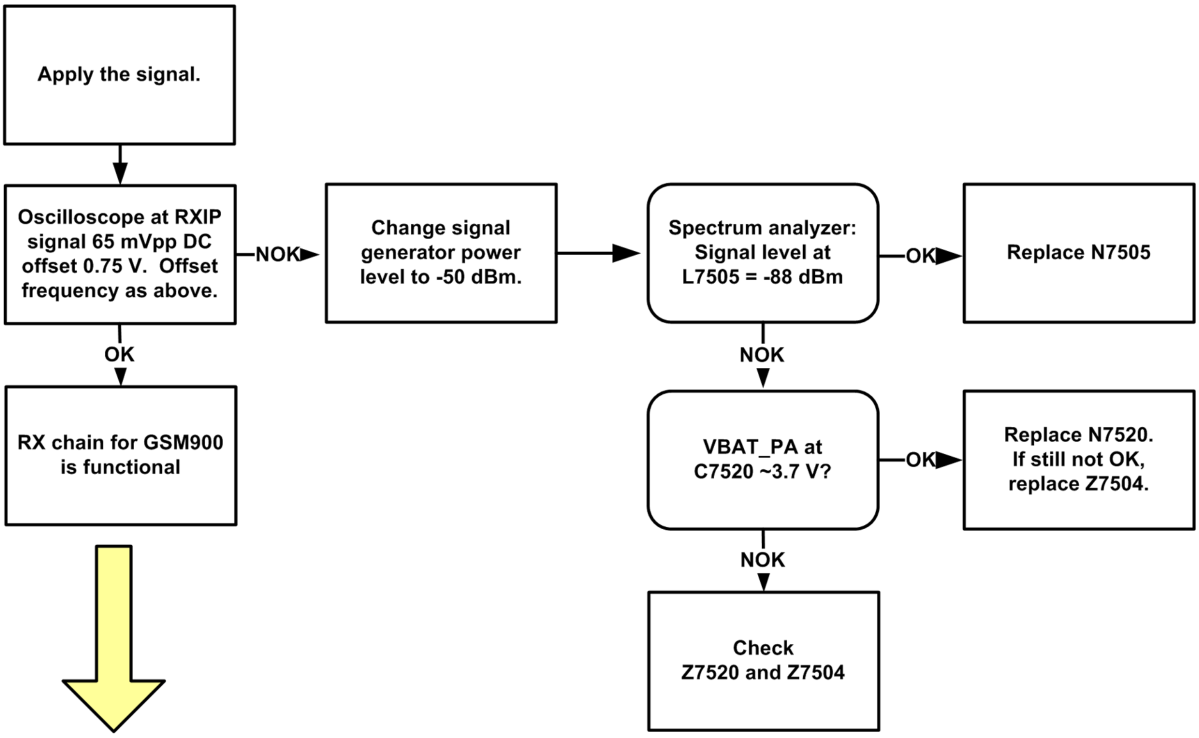
Context

Troubleshoot one band at a time. Start with GSM850 and end with GSM1900.

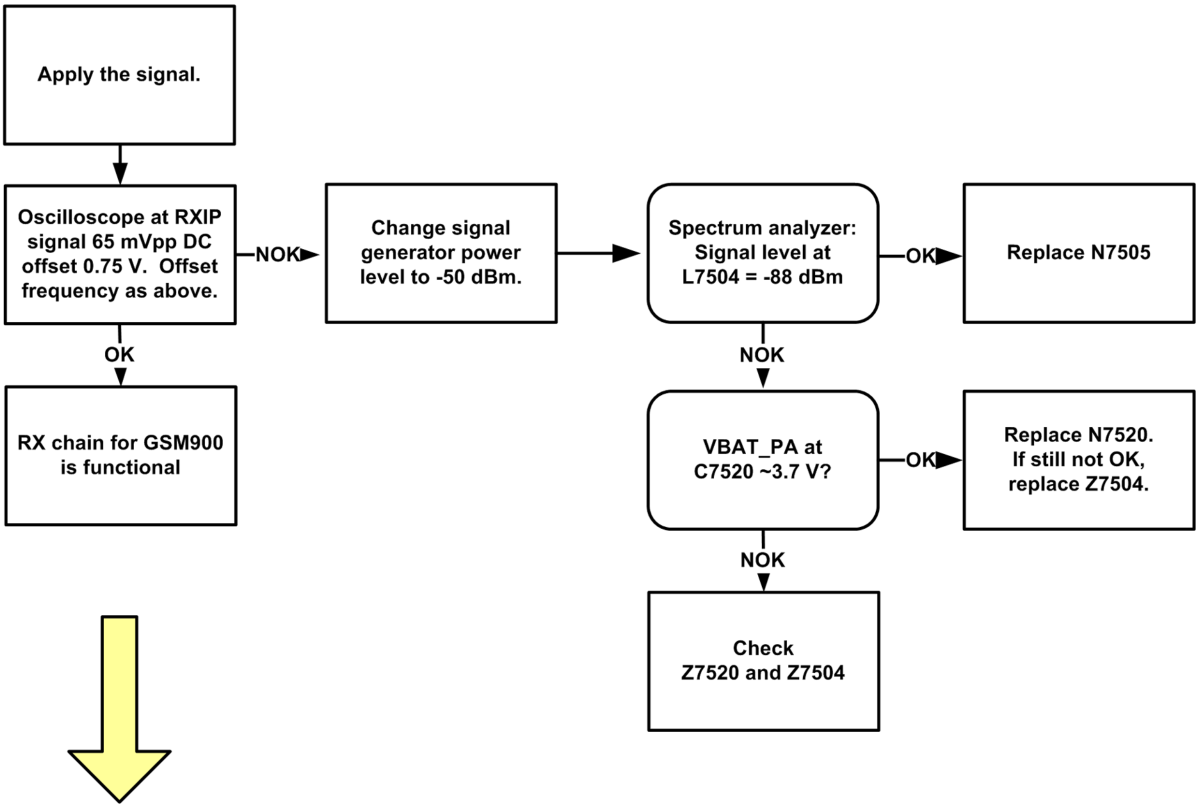
Receiver troubleshooting

Apply a signal according to the table in General instructions for RX troubleshooting (page 7–7)

GSM850


Apply the signal.
Oscilloscope at RXIP signal 65 mVpp DC offset 0.75 V. Offset frequency as above.
NOK
Change signal generator power level to -50 dBm.
Spectrum analyzer: Signal level at L7505 = -88 dBm
OK
Replace N7505
OK
RX chain for GSM900 is functional
NOK
VBAT_PA at C7520 ~3.7 V?
OK
Replace N7520. If still not OK, replace Z7504.
NOK
Check Z7520 and Z7504

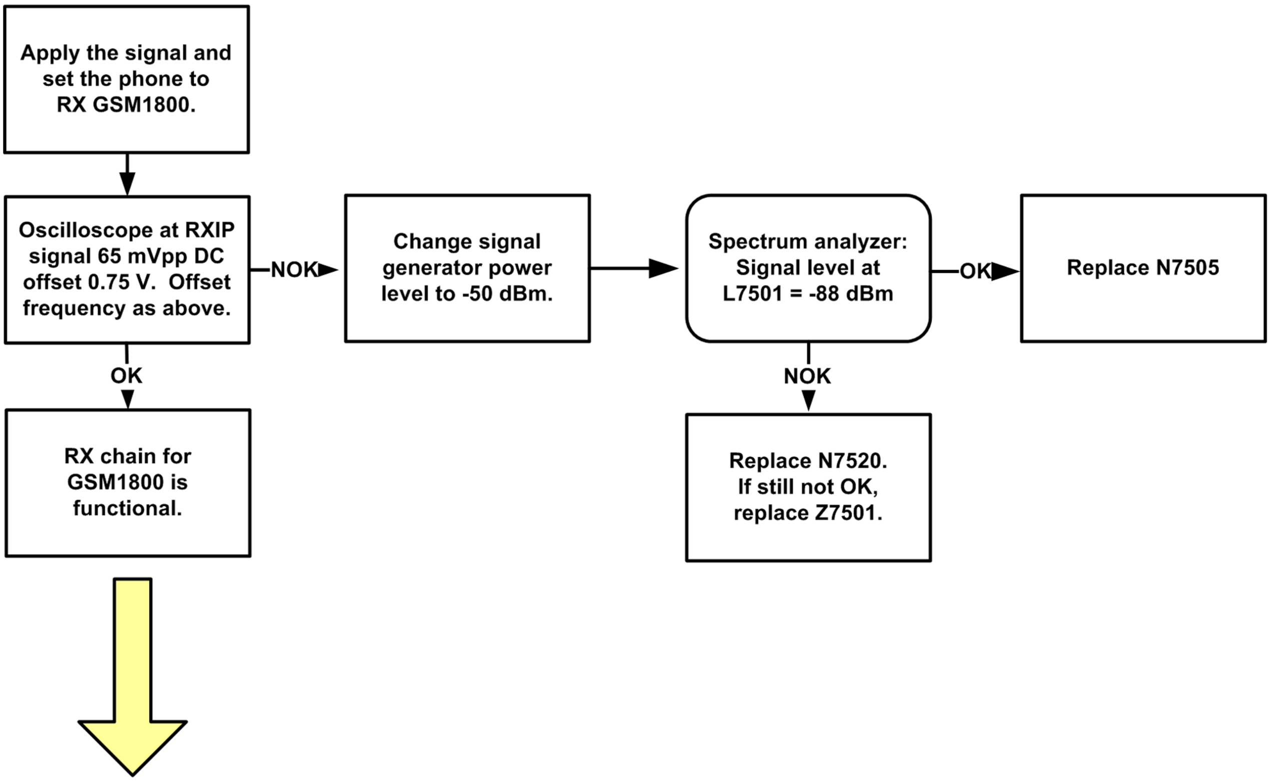
GSM900


Apply the signal.
Oscilloscope at RXIP signal 65 mVpp DC offset 0.75 V. Offset frequency as above.
NOK
Change signal generator power level to -50 dBm.
Spectrum analyzer: Signal level at L7504 = -88 dBm
OK
Replace N7505
OK
RX chain for GSM900 is functional
NOK
VBAT_PA at C7520 ~3.7 V?
OK
Replace N7520. If still not OK, replace Z7504.
NOK
Check Z7520 and Z7504

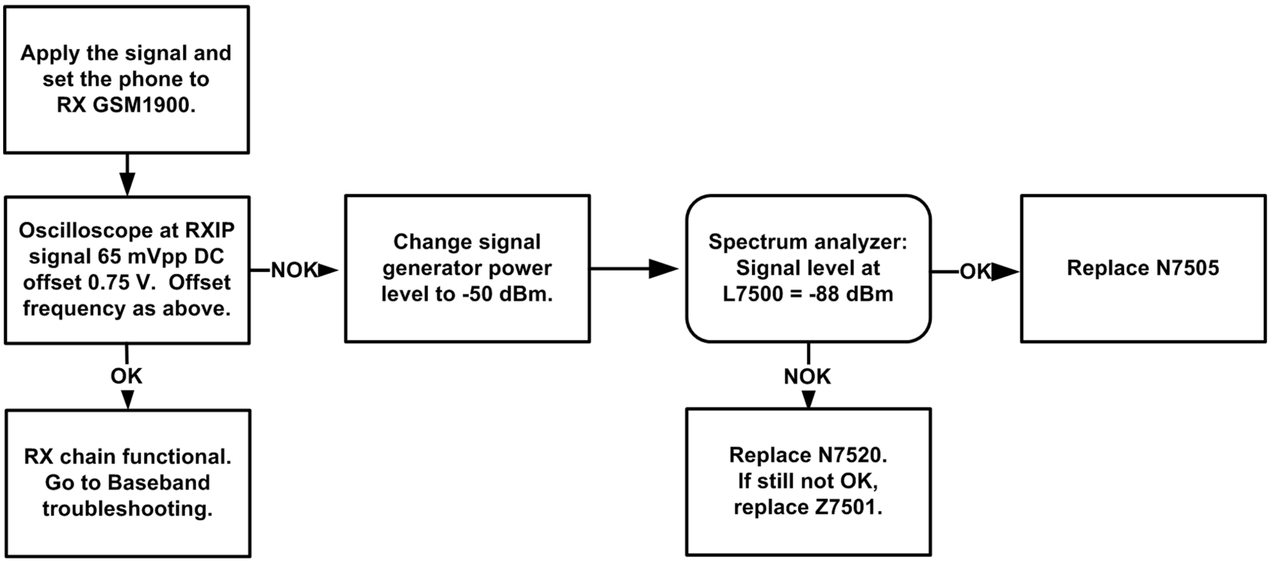
Continue on next page

Continued from previous page

GSM1800


Apply the signal and set the phone to RX GSM1800.
Oscilloscope at RXIP signal 65 mVpp DC offset 0.75 V. Offset frequency as above.
NOK
Change signal generator power level to -50 dBm.
Spectrum analyzer: Signal level at L7501 = -88 dBm
OK
Replace N7505
NOK
Replace N7520. If still not OK, replace Z7501.
OK
RX chain for GSM1800 is functional.

GSM1900


Apply the signal and set the phone to RX GSM1900.
Oscilloscope at RXIP signal 65 mVpp DC offset 0.75 V. Offset frequency as above.
NOK
Change signal generator power level to -50 dBm.
Spectrum analyzer: Signal level at L7500 = -88 dBm
OK
Replace N7505
NOK
Replace N7520. If still not OK, replace Z7501.
OK
RX chain functional. Go to Baseband troubleshooting.

GSM Rx chain activation for manual measurements / GSM RSSI measurement

Context

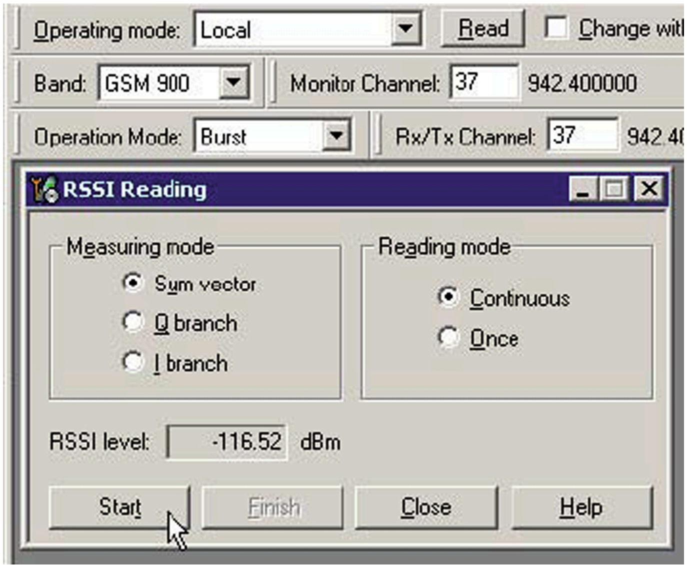
RSSI signal measurement is the main Rx troubleshooting measurement. The test measures the strength of the received signal.

I and Q branches can be measured separately. In GSM, the input signal can be either a real GSM signal or a CW (Continuous Wave) signal that is 67.771 kHz above the carrier frequency.

Steps

1. Start *Phoenix* service software.
2. Choose **Testing→GSM→RSSI Reading** .
3. Set the RF signal generator for a channel frequency +67.771 kHz in CW mode with a –80 dBm signal level.

   Alternatively set the cellular tester downlink channel to the appropriate channel. Make sure that the tester is set to continuous mode, not to burst mode.
4. In the *RSSI Reading* window, select the appropriate band and channel.



Operating mode: Local
Band: GSM 900
Monitor Channel: 37 942.400000
Operation Mode: Burst
Rx/Tx Channel: 37 942.4

Measuring mode: ● Sum vector ○ Q branch ○ I branch
Reading mode: ● Continuous ○ Once
RSSI level: -116.52 dBm

Figure 52 *RSSI Reading* window

5. To start the measurement, activate GSM Rx chain, click **Start**.

Results

RSSI reading values of the selected band and channel are displayed. The RSSI level must be the same value as that which is set at the signal generator (-80 dBm).

Transmitter troubleshooting

General instructions for TX troubleshooting

Context

- Tx troubleshooting requires Tx operation.
- Do not transmit on frequencies that are in use!
- Transmitter can be controlled in the local mode for diagnostic purposes.
- The most useful Phoenix tool for GSM transmitter testing is "RF Controls".

- Tx IQ tuning and Tx power tuning can be also used in some cases.
- Remember that retuning is not a fix! Phones are tuned correctly in production.

The first set of steps instructs how to assemble the test setup. This setup is general for all Tx troubleshooting tasks.

Alternative steps provide specific troubleshooting instructions for *Phoenix* service software.

> **Caution:** Never activate the GSM transmitter without a proper antenna load. There should be always 50 Ω load connected to the RF connector (antenna, RF-measurement equipment or at least 2 W dummy load), otherwise the GSM Power amplifier may be damaged.

Steps

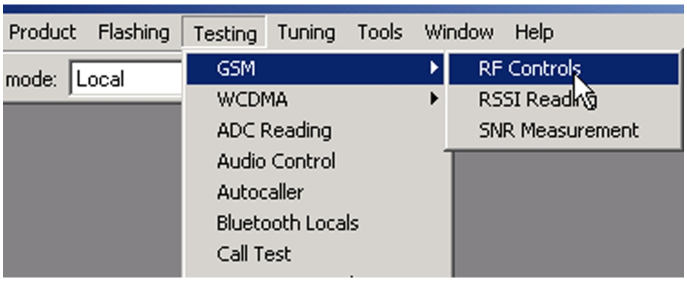
1. Connect a test jig to a computer with a DAU-9S cable or to a FPS-10 flash prommer with a modular cable (XCS-4).

   Make sure that you have a PKD-1 dongle connected to the computer's parallel port.
2. Connect CU-4 with 12 V supply. The DC supply voltage is set to 3.7 V by default (in Phoenix).
3. Connect an RF cable between the RF connector of the module test jig (MJ-92) and measurement equipment or alternatively use a 50 Ω (at least 2 W) dummy load in the module test jig RF connector, otherwise GSM may be damaged.

   > **Note:** There are two antenna connectors in the module jig:
   >
   > - one for GSM
   > - one for Bluetooth
   >
   > Make sure that all connections are made to the correct RF connector.

   Normally a spectrum analyser is used as measurement equipment.

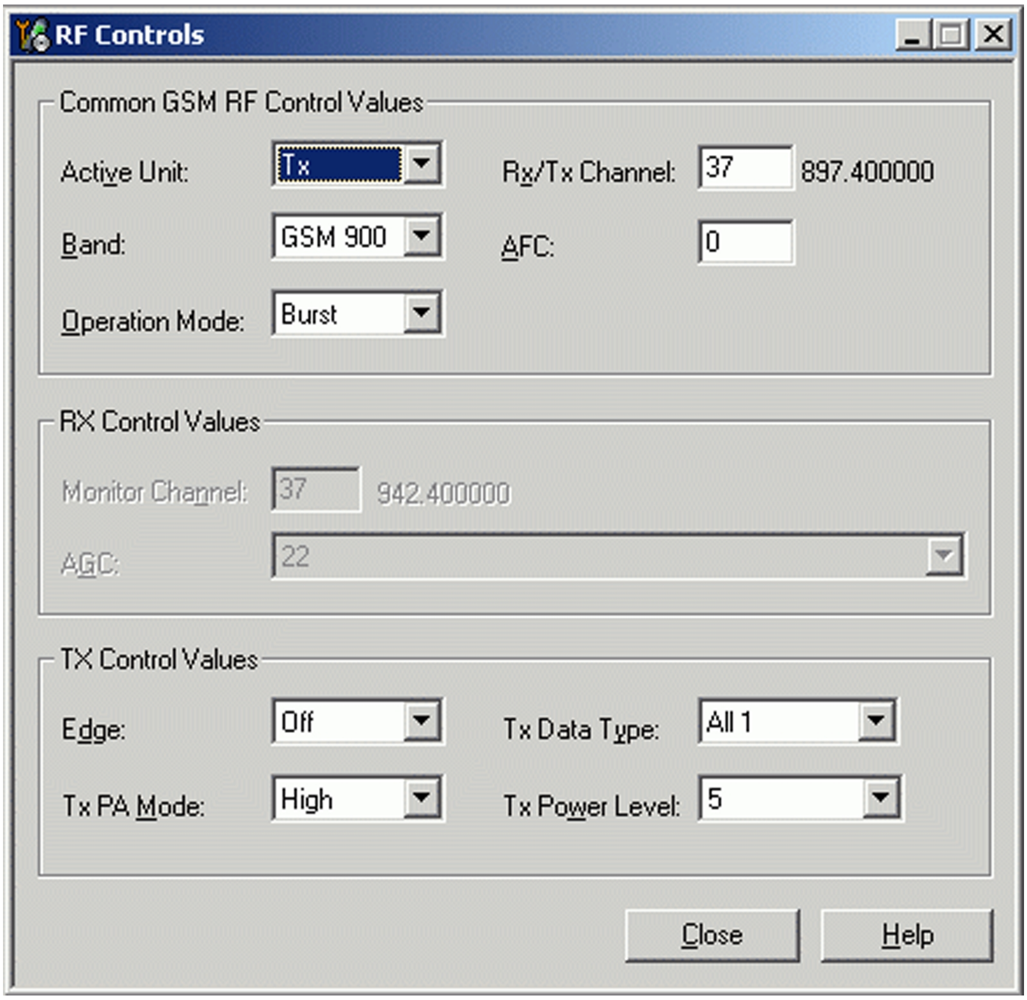
   > **Note:** The maximum input power of a spectrum analyser is +30 dBm.
   >
   > To prevent any damage, it is recommended to use 10 dB attenuator on the spectrum analyzer input.
4. Set Tx on.
   i Set the phone module to the test jig and start *Phoenix service software*.
   ii Initialize connection to the phone. (With the FPS-10 prommer use FPS10_USB or FPS10_TCP drivers, depending on connection type. When using DAU-9S select FBUS driver).
   iii From the File menu, choose product: **File -> Choose Product -> xx-x*** (* = type designator of the phone)RM-146/147), or press**Ctrl + R** to scan product.
   iv From the toolbar, set operating mode to “Local”.
5. GSM850/900/1800/1900 troubleshooting
   i From the Testing menu, activate the *RF Controls* window: **Testing -> GSM -> RF Controls** .



   ii In the *RF Controls* window:
   - Select band "GSM850", “GSM900” or “GSM1800” or “GSM1900” (Default = “GSM850”).
   - Set Active unit to “Tx” (Default = “Rx”).

- Set Operation mode to “Burst” (Default).
- Set Tx data type to “All1” (Default).
- Set Rx/Tx channel (see table below)
- Set Edge to “Off” (Default).
- Set Tx PA mode to “High” (Default).
- Set power level (see table below)

Band	Channel (RX and TX)	TX power level
GSM850	190	5
GSM900	37	5
GSM1800	700	0
GSM1900	661	0


RF Controls

Common GSM RF Control Values
Active Unit: Tx
Rx/Tx Channel: 37 897.400000
Band: GSM 900
AFC: 0
Operation Mode: Burst

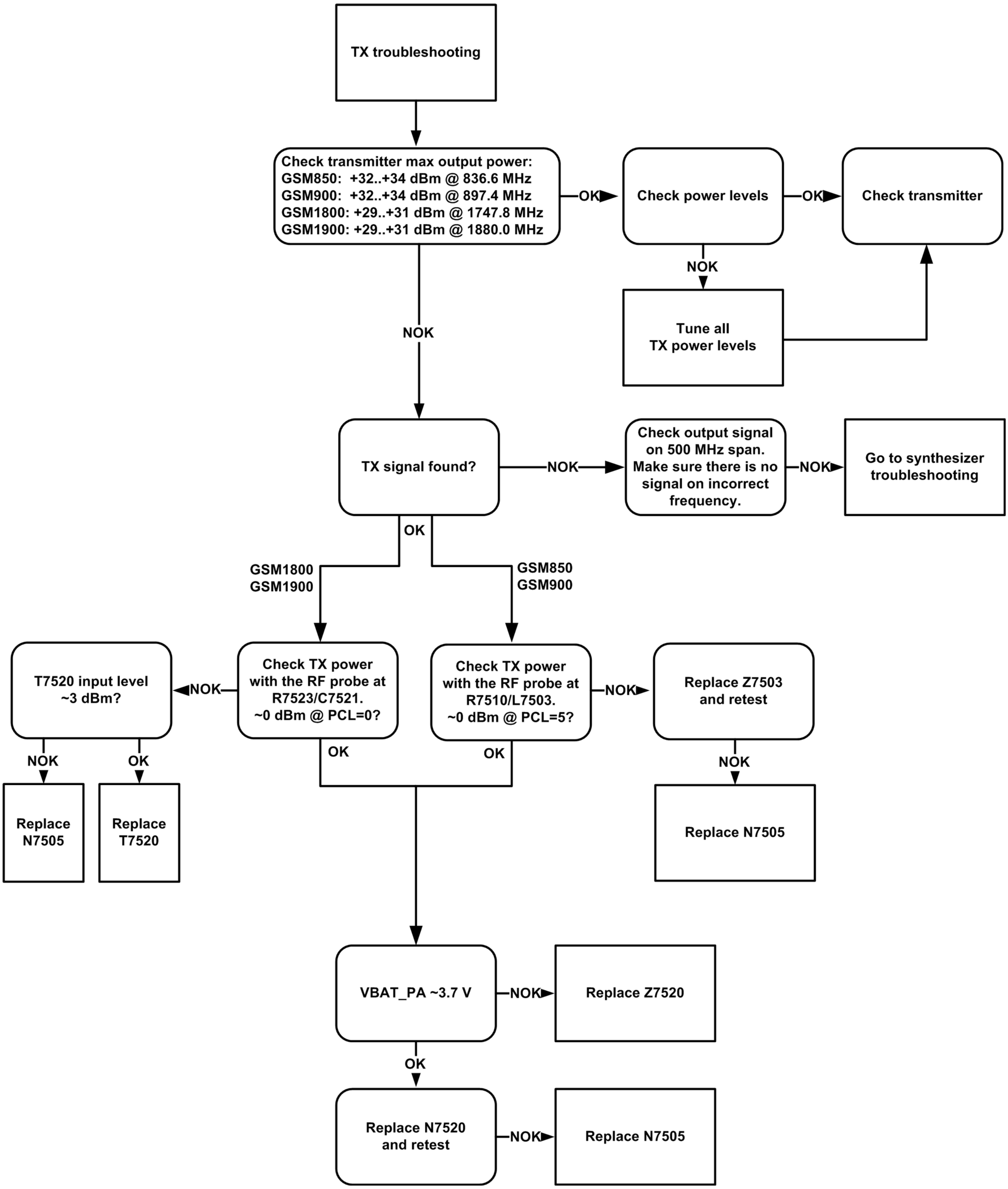
RX Control Values
Monitor Channel: 37 942.400000
AGC: 22

TX Control Values
Edge: Off
Tx Data Type: All 1
Tx PA Mode: High
Tx Power Level: 5

Figure 53 RF Controls window

Transceiver (TX) troubleshooting

Troubleshooting flow


TX troubleshooting
Check transmitter max output power:
GSM850: +32..+34 dBm @ 836.6 MHz
GSM900: +32..+34 dBm @ 897.4 MHz
GSM1800: +29..+31 dBm @ 1747.8 MHz
GSM1900: +29..+31 dBm @ 1880.0 MHz
OK
Check power levels
OK
Check transmitter
NOK
Tune all TX power levels
NOK
TX signal found?
NOK
Check output signal on 500 MHz span. Make sure there is no signal on incorrect frequency.
NOK
Go to synthesizer troubleshooting
OK
GSM1800 GSM1900
GSM850 GSM900
T7520 input level ~3 dBm?
NOK
Check TX power with the RF probe at R7523/C7521. ~0 dBm @ PCL=0?
Check TX power with the RF probe at R7510/L7503. ~0 dBm @ PCL=5?
NOK
Replace Z7503 and retest
NOK
OK
NOK
OK
OK
Replace N7505
Replace T7520
Replace N7505
VBAT_PA ~3.7 V
NOK
Replace Z7520
OK
Replace N7520 and retest
NOK
Replace N7505

Checking antenna functionality

In the antenna, there is one Feed and two GND contacts.

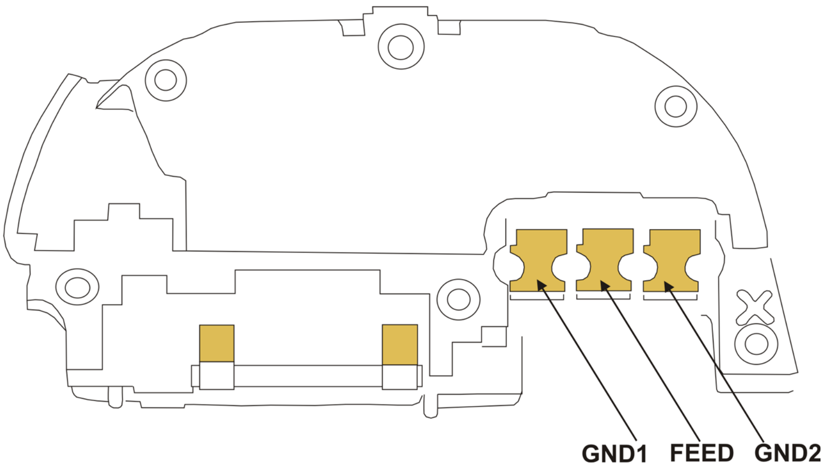


Figure 54 Antenna module

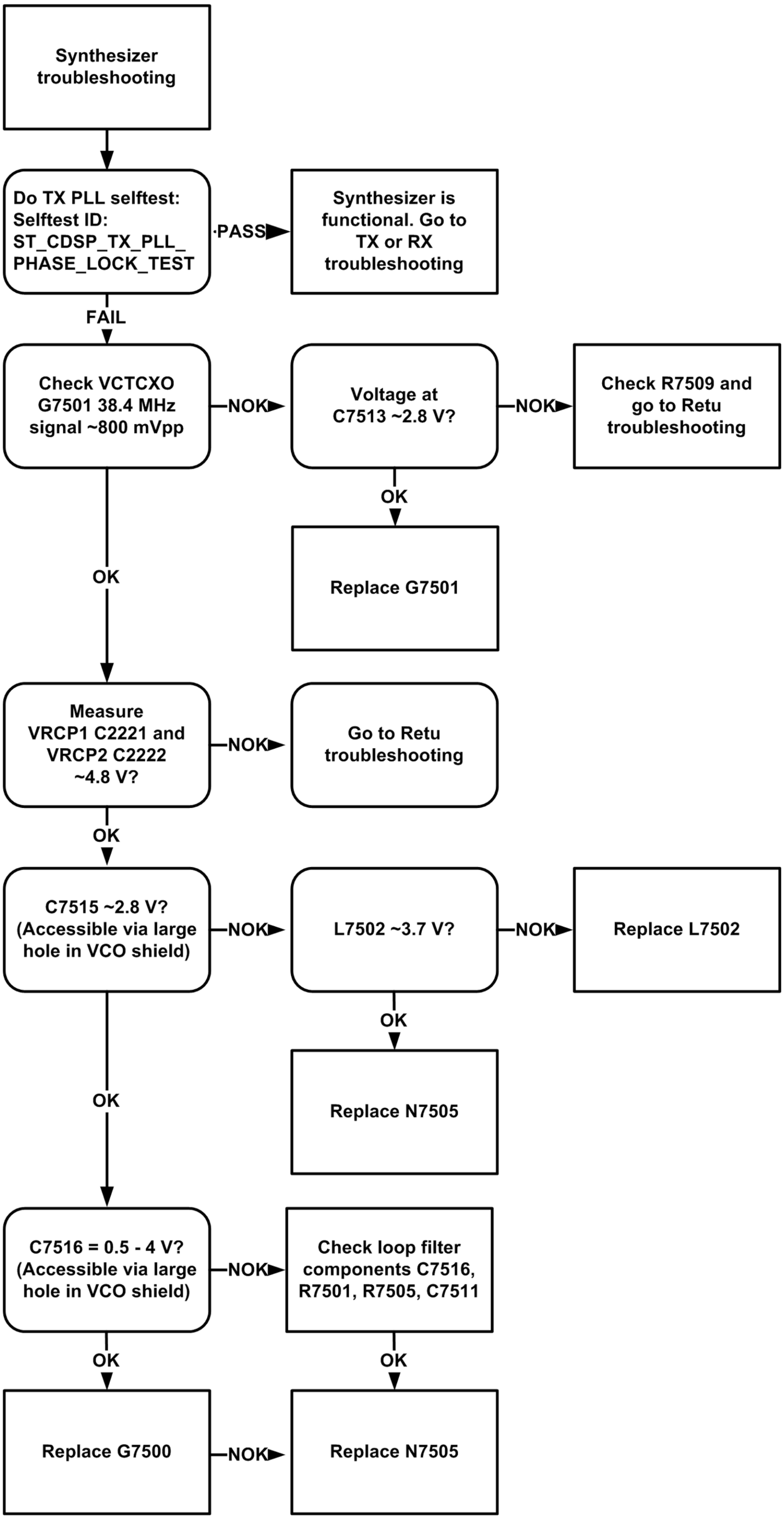
Between GND1 and Feed, a DC short-circuit can be measured.

GND2 has no DC connection to the other contacts.

The antenna is functioning normally when the contacts function (Feed-GND1 = ~0.2 Ω) Also check visually to make sure that the antenna is intact.

Synthesizer troubleshooting

Synthesizer troubleshooting


Synthesizer troubleshooting
Do TX PLL selftest: Selftest ID: ST_CDSP_TX_PLL_ PHASE_LOCK_TEST
PASS
Synthesizer is functional. Go to TX or RX troubleshooting
FAIL
Check VCTCXO G7501 38.4 MHz signal ~800 mVpp
NOK
Voltage at C7513 ~2.8 V?
NOK
Check R7509 and go to Retu troubleshooting
OK
Replace G7501
OK
Measure VRCP1 C2221 and VRCP2 C2222 ~4.8 V?
NOK
Go to Retu troubleshooting
OK
C7515 ~2.8 V? (Accessible via large hole in VCO shield)
NOK
L7502 ~3.7 V?
NOK
Replace L7502
OK
Replace N7505
OK
C7516 = 0.5 - 4 V? (Accessible via large hole in VCO shield)
NOK
Check loop filter components C7516, R7501, R7505, C7511
OK
OK
Replace G7500
NOK
Replace N7505

RF tunings

Introduction to RF tunings

Important: Only perform RF tunings if:

- one or more of the RF components have been replaced
- flash memory chip is replaced or corrupted.

RF calibration is always performed with the help of a product-specific module jig (MJ-92), never with an RF coupler. Using an RF coupler in the calibration phase will cause a complete mistuning of the RF part.

Important: After RF component replacements, **always** use autotuning. Manual tunings are only required in rare cases.

Cable and adapter losses

RF cables and adapters have some losses. They have to be taken into account when the phone is tuned. As all RF losses are frequency dependent, the user has to act very carefully and understand the measurement setup.

For RF attenuations of the module jig, please refer to the Service tools section.

Auto tuning for BB5.0

This phone can be tuned automatically.

Autotune is designed to align the phone's RF part easier and faster. It performs calibrations, tunings and measurements of RX and TX. The results are displayed and logged in a result file, if initiated.

Hardware set up

Hardware requirements for auto tuning:

- PC (Windows 2000/XP) with GPIB card
- Power supply
- Product specific module jig
- Cables: XRF-1 (RF cable), USB cable, GBIP cable and DAU-9S
- Signal analyser (TX), signal generator (RX) and RF-splitter *or* one device including all.

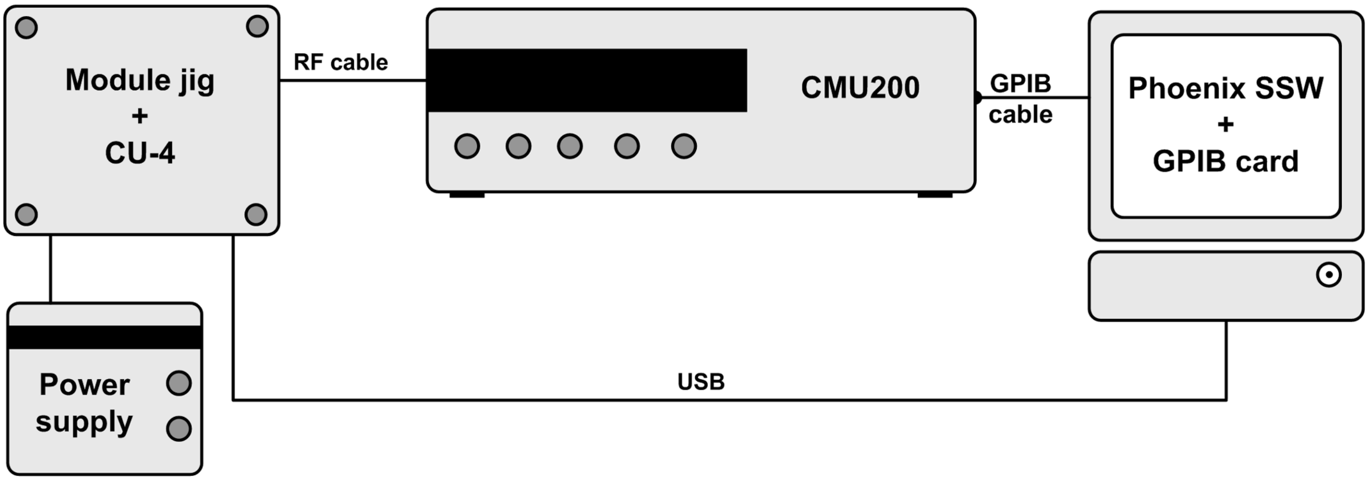


Figure 55 Auto tuning concept with CMU200

Phoenix preparations

Install the phone specific data package, for example *RM-146/147_dp_1.78_sw_sh3.26.exe*. This defines phone specific settings..

Auto tuning procedure

1 Make sure the phone (in the jig) is connected to the equipment. Else, some menus will not be shown in Phoenix.
2 To go to autotune, select *Tuning (Alt-U)* > *Auto-Tune (Alt-A)* from the menu.
3 Start autotuning, clicking the *Tune* button.

System mode independent manual tunings

RF channel filter calibration

Context

Rf channel filter calibration tunes the internal low pass filters of the RF ASIC, that limit the bandwidth of BB IQ signals.

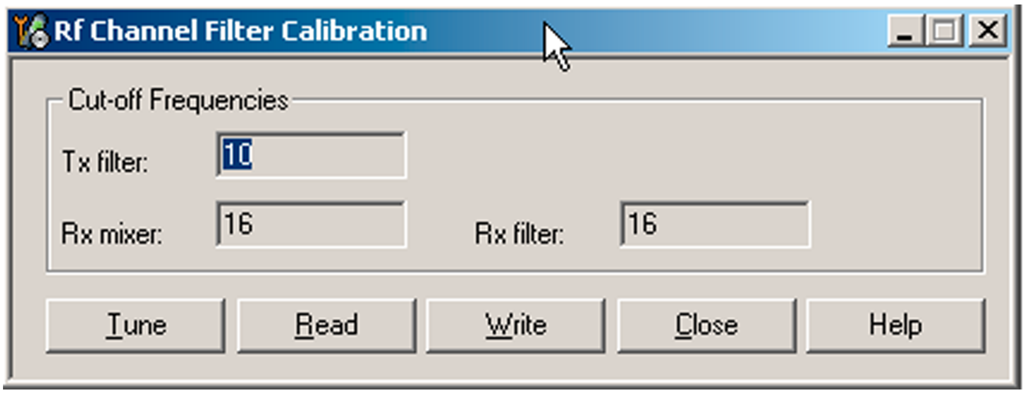
Table 16 Rf channel filter calibration tuning limits

	Min	Typ	Max
Tx filter	0	10	31
RX mixer	0	13	31
Rx filter	0	16	31

Steps

1. From the **Operating mode** drop-down menu, set mode to **Local**.
2. Choose **Tuning→Rf Channel Filter Calibration** .
3. Click **Tune**.
4. To save the values to the PMM (Phone Permanent Memory) area, click **Write**.
5. To close the *Rf Channel Filter Calibration* window, click **Close**.

Results



Tx filter: 10
Rx mixer: 16
Rx filter: 16

Figure 56 Rf channel filter calibration typical values

PA (power amplifier) detection

Context

The PA detection procedure detects which PA manufacturer is used for phone PAs.

If a PA is changed or if the permanent memory (PMM) data is corrupted, PA detection has to be performed before Tx tunings.

Steps

1. From the **Operating mode** drop-down menu, set mode to **Local**.
2. Choose **Tuning**→**PA Detection** .
3. Click **Tune**.
4. Check that the detected PA manufacturers are corresponding to the actual chips on the board.
5. To end the procedure, click **Close**.

GSM receiver tunings

Rx calibration (GSM)

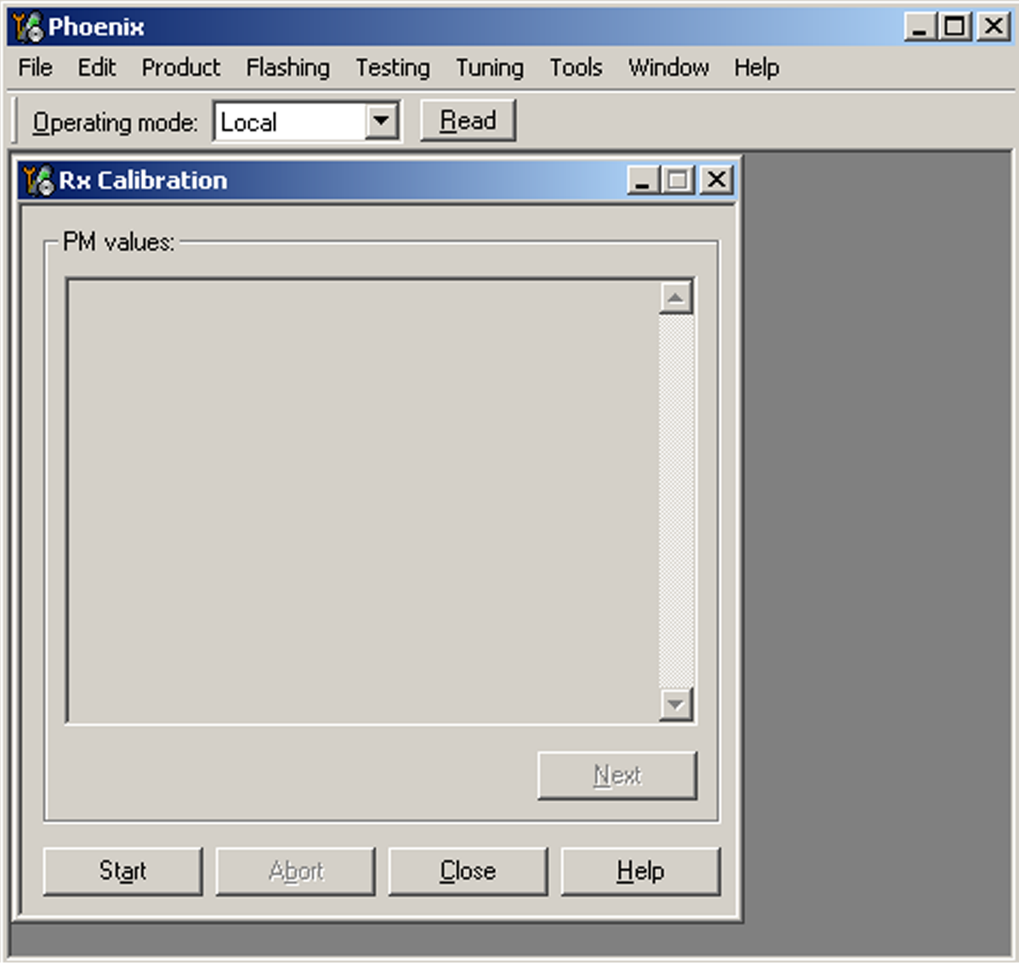
Context

Rx Calibration is used to find out the real gain values of the GSM Rx AGC system and tuning response of the AFC system (AFC D/A init value and AFC slope)

Steps

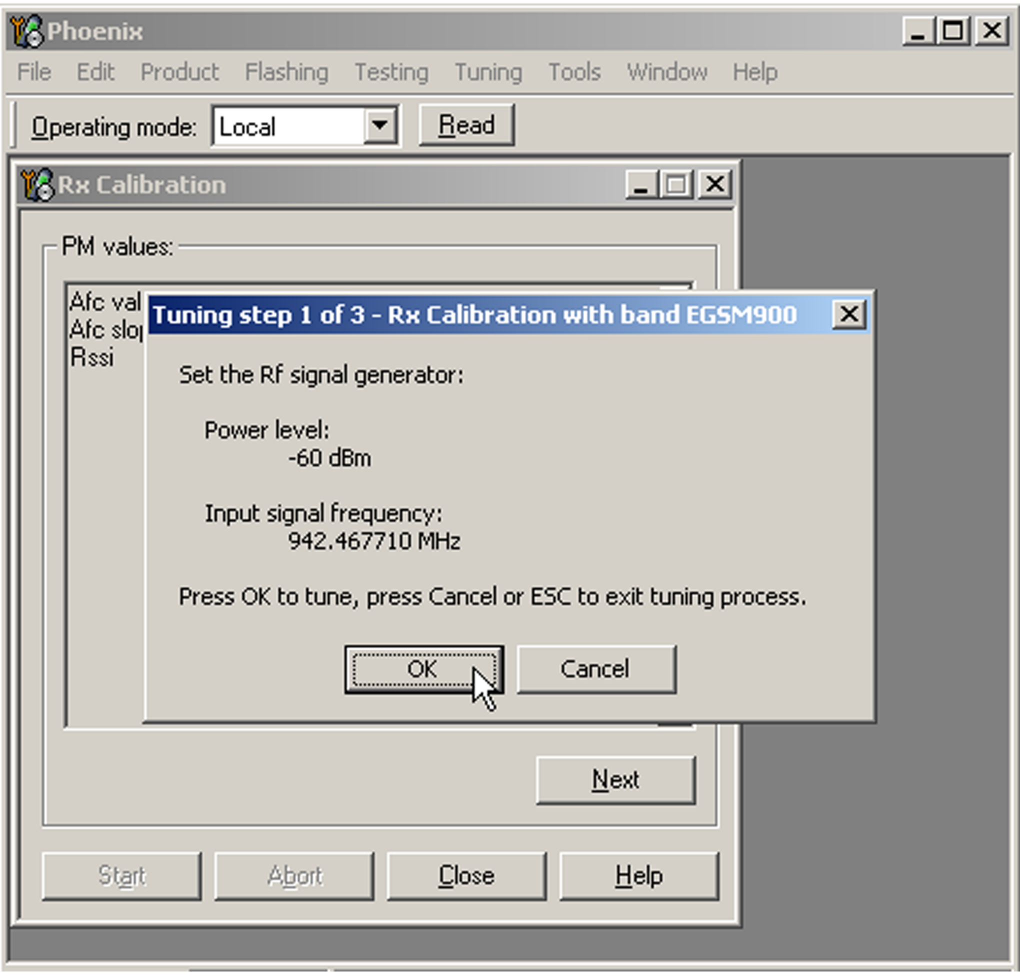
1. Connect the GSM connector of the module jig to a signal generator.
2. Start *Phoenix* service software.
3. From the **Operating mode** drop-down menu, set mode to **Local**.
4. Choose **Tuning**→**GSM**→**Rx Calibration** .

5. Click **Start**.


Phoenix
File Edit Product Flashing Testing Tuning Tools Window Help
Operating mode: Local
Read
Rx Calibration
PM values:
Next
Start
Abort
Close
Help

6. Connect the signal generator to the phone, and set frequency and amplitude as instructed in the **Rx Calibration with band EGSM900** (step 1-3) pop-up window.

   Important: The calibration uses a non-modulated CW signal. Increase the signal generator level by cable attenuation and module jig probe attenuation.


Phoenix
File Edit Product Flashing Testing Tuning Tools Window Help
Operating mode: Local
Read
Rx Calibration
PM values:
Afc val
Afc slo
Rssi
Next
Start
Abort
Close
Help
Tuning step 1 of 3 - Rx Calibration with band EGSM900
OK
Cancel

Set the Rf signal generator:

Power level:
-60 dBm

Input signal frequency:
942.467710 MHz

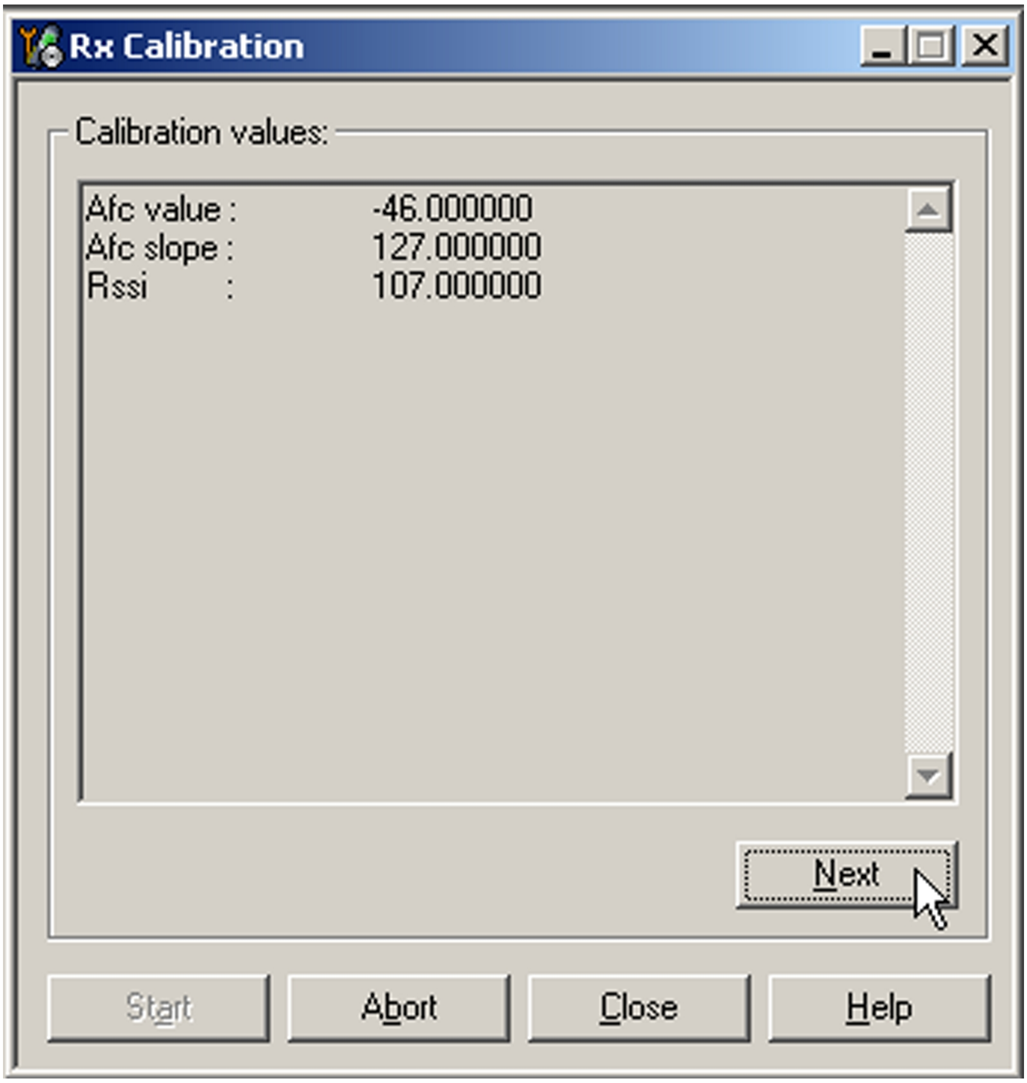
Press OK to tune, press Cancel or ESC to exit tuning process.

7. To perform the tuning, click **OK**.
8. Check that the tuning values are within the limits specified in the following table:

Table 17 RF tuning limits in Rx calibration

	Min	Typ	Max	Unit
GSM850				
AFC Value (init)	-200	-80..40	200	dB
AFC slope	0	108..121	200	dB
RSSI (AGC-0)	106	107..110	114	dB
GSM900				
AFC Value (init)	-200	-105..62	200	dB
AFC slope	0	122	200	dB
RSSI (AGC-0)	106	107...110	114	dB
GSM1800				
RSSI (AGC-0)	105	105...109	114	dB
GSM1900				
RSSI (AGC-0)	105	105...109	114	dB

9. Click **Next** to continue with GSM1800 Rx tuning.



Afc value : -46.000000
Afc slope : 127.000000
Rssi : 107.000000

Next actions

Repeat steps 6 to 9for GSM1800 and GSM1900

Rx band filter response compensation (GSM)

Prerequisites

Rx calibration must be performed before the Rx band filter response compensation.

Context

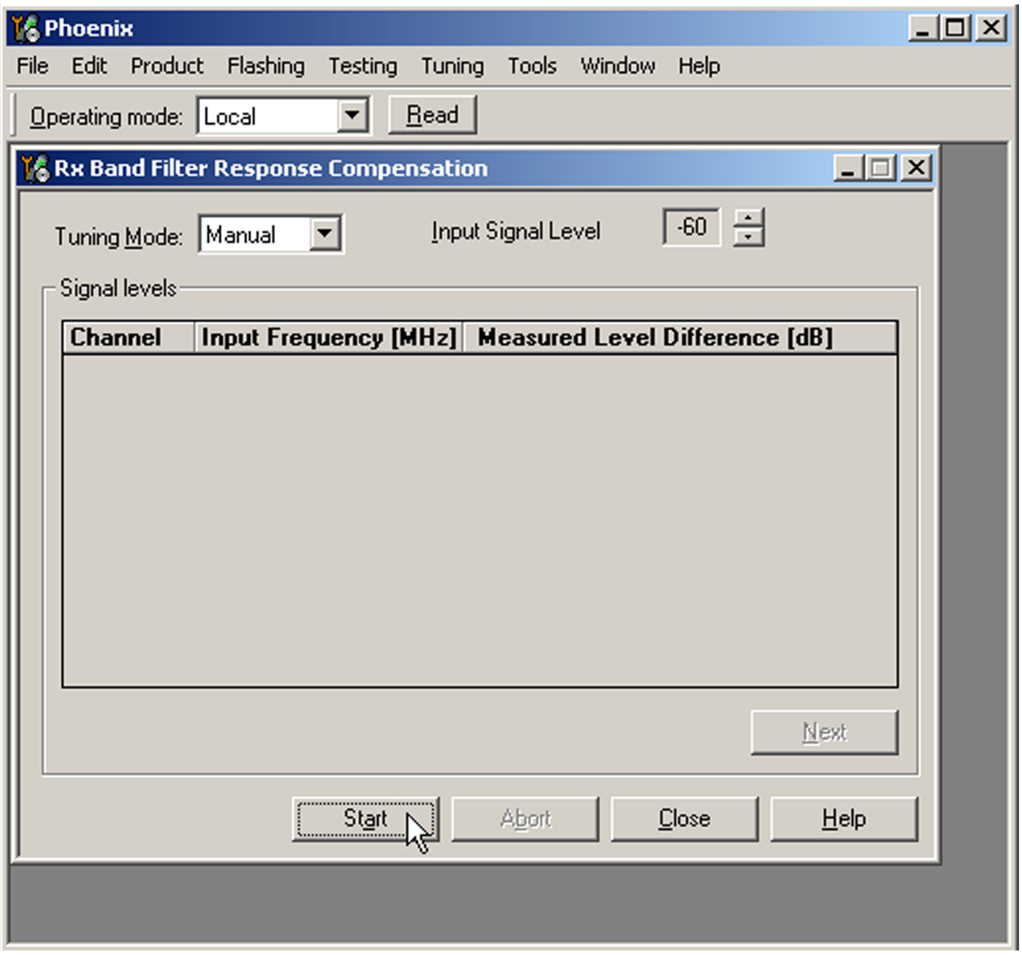
On each GSM Rx band, there is a band filter in front of the RF ASIC front end. The amplitude ripple caused by these filters causes ripple to the RSSI measurement, and therefore calibration is needed.

The calibration has to be repeated for each GSM band.

Steps

1. Connect the GSM connector of the module jig to a signal generator.
2. Start *Phoenix* service software.
3. From the **Operating mode** drop-down menu, set mode to **Local**.

4. Select **GSM900** band.
5. Choose **Tuning→GSM→Rx Band Filter Response Compensation** .
6. Select **Tuning mode: manual**
7. Click **Start**.


Phoenix
File Edit Product Flashing Testing Tuning Tools Window Help
Read
Rx Band Filter Response Compensation
Signal levels
Next
Start
Abort
Close
Help

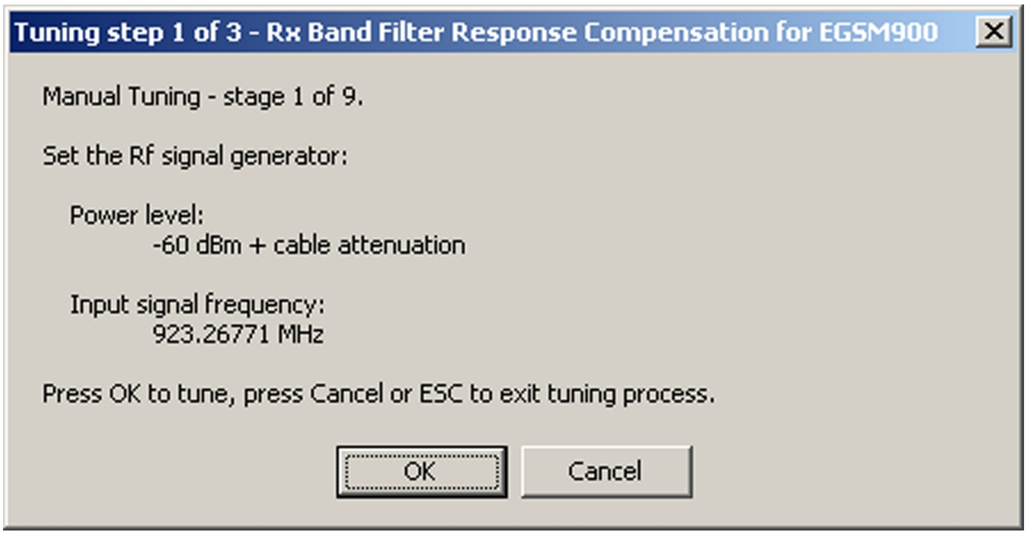
Operating mode: Local

Tuning Mode: Manual

Input Signal Level -60

Channel	Input Frequency [MHz]	Measured Level Difference [dB]

8. Connect the signal generator to the phone, and set frequency and amplitude as instructed in the *Rx Band Filter Response Compensation for EGSM900* pop-up window, step 1-3.



Tuning step 1 of 3 - Rx Band Filter Response Compensation for EGSM900

Manual Tuning - stage 1 of 9.

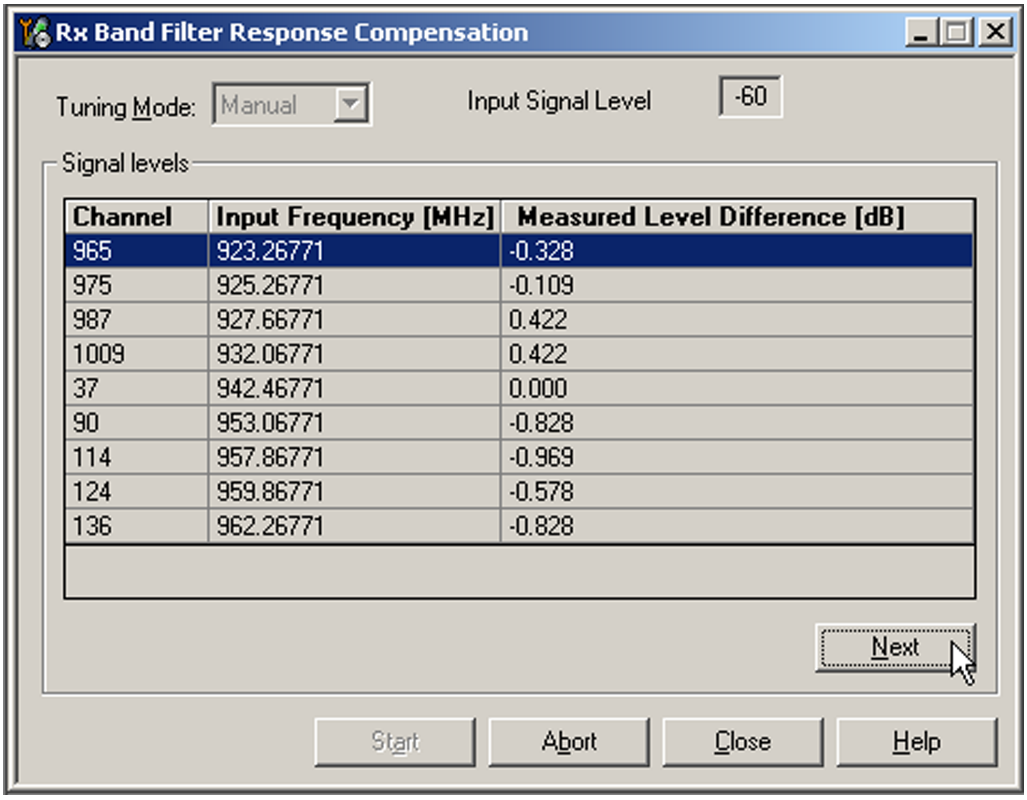
Set the Rf signal generator:

Power level:
-60 dBm + cable attenuation

Input signal frequency:
923.26771 MHz

Press OK to tune, press Cancel or ESC to exit tuning process.

9. To perform tuning, click **OK**.
10. Go through all 9 frequencies. The following table will be shown:



Tuning Mode: Manual

Input Signal Level: -60

Signal levels

Channel	Input Frequency [MHz]	Measured Level Difference [dB]
965	923.26771	-0.328
975	925.26771	-0.109
987	927.66771	0.422
1009	932.06771	0.422
37	942.46771	0.000
90	953.06771	-0.828
114	957.86771	-0.969
124	959.86771	-0.578
136	962.26771	-0.828

11. Check that the tuning values are within the limits specified in the following table:

	Min	Typ	Max	Unit
GSM850				
Ch. 118/867.26771 MHz	-6	-1	2	dB
Ch. 128/869.26771 MHz	-3	0	2	dB
Ch. 140/871.66771 MHz	-3	0	2	dB
Ch. 172/878.06771 MHz	-2	0	2	dB
Ch. 190/881.66771 MHz	-2	0	2	dB
Ch. 217 / 887.06771 MHz	-2	0	2	dB
Ch. 241/891.86771 MHz	-3	0	2	dB
Ch. 251/893.86771 MHz	-3	0	2	dB
Ch. 261/895.86771 MHz	-6	-1	-2	dB
GSM900				
Ch. 965 / 923.26771 MHz	-6	-1	2	dB
Ch. 975 / 925.26771 MHz	-3	0	2	dB
Ch. 987 / 927.66771 MHz	-3	0	2	dB
Ch. 1009 / 932.06771 MHz	-2	0	2	dB

	Min	Typ	Max	Unit
Ch. 37 / 942.46771 MHz	-2	0	2	dB
Ch. 90 / 953.06771 MHz	-2	0	2	dB
Ch. 114 / 957.86771 MHz	-3	0	2	dB
Ch. 124 / 959.86771 MHz	-3	0	2	dB
Ch. 136 / 962.26771 MHz	-6	-1	2	dB
GSM1800				
Ch. 497 / 1802.26771 MHz	-6	-1	3	dB
Ch. 512 / 1805.26771 MHz	-3	0	3	dB
Ch. 535 / 1809.86771 MHz	-3	0	3	dB
Ch. 606 / 1824.06771 MHz	-3	0	3	dB
Ch. 700 / 1842.86771 MHz	-3	0	3	dB
Ch. 791 / 1861.06771 MHz	-3	0	3	dB
Ch. 870 / 1876.86771 MHz	-3	0	3	dB
Ch. 885 / 1879.86771 MHz	-3	0	3	dB
Ch. 908 / 1884.46771 MHz	-6	-1	3	dB
GSM1900				
Ch. 496 / 1927.06771 MHz	-6	-1	2	dB
Ch. 512 / 1930.26771 MHz	-3	0	2	dB
Ch. 537 / 1935.26771 MHz	-3	0	2	dB
Ch. 586 / 1945.06771 MHz	-3	0	2	dB
Ch. 661 / 1960.06771 MHz	-3	0	2	dB
Ch. 736 / 1975.06771 MHz	-3	0	2	dB
Ch. 794 / 1986.66771 MHz	-3	0	2	dB
Ch. 810 / 1989.86771 MHz	-3	0	2	dB
Ch. 835 / 1994.86771 MHz	-6	-1	2	dB

12. If the values are within the limits, click **Next** to continue to the next band.

Next actions

Repeat the steps 8 to 12 for GSM1800 and GSM1900.

■ GSM transmitter tunings

Tx IQ tuning (GSM)

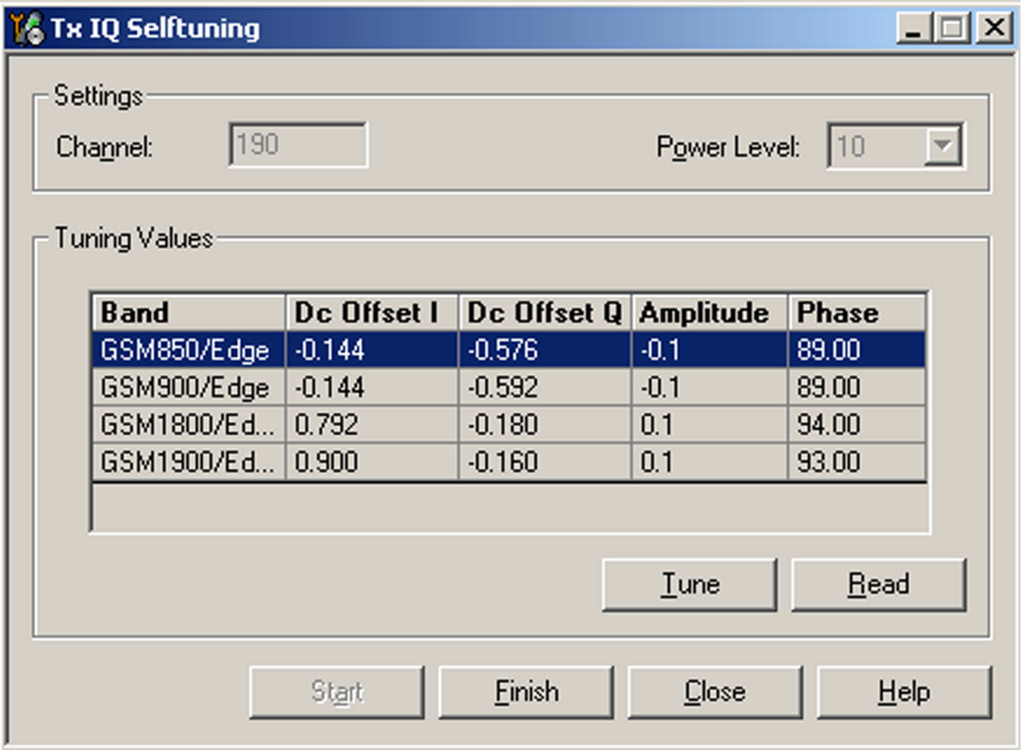
Context

The Tx path branches to I and Q signals at RF I/Q modulator. Modulator and analog hardware located after it cause unequal amplitude and phase disturbance to I and Q signal paths. Tx IQ tuning balances the I and Q branches.

Tx IQ tuning must be performed for all GSM bands.

Steps

1. Start *Phoenix* service software.
2. From the **Operating mode** drop-down menu, set mode to **Local**.
3. Choose **Tuning→GSM→Tx IQ Tuning** .
4. Select **Mode: Automatic**.



Channel: 190

Power Level: 10

Band	Dc Offset I	Dc Offset Q	Amplitude	Phase
GSM850/Edge	-0.144	-0.576	-0.1	89.00
GSM900/Edge	-0.144	-0.592	-0.1	89.00
GSM1800/Ed...	0.792	-0.180	0.1	94.00
GSM1900/Ed...	0.900	-0.160	0.1	93.00

5. Select **Band: GSM900** and click **Start**.
6. Click **Next** to start GSM1800 band TX IQ tuning.
7. Click **Next** to start GSM1900 band TX IQ tuning.
8. Click**Finish** and then **Close**.

Next actions

Tuning sliders should be close to the center of the scale after the tuning and within the limits specified in the following table. If they are not within the limits, check Tx IQ quality manually.

	Min	Typ	Max	Unit
GSM850				
I DC offset / Q DC offset	-6	-4	6	%
Ampl	-1	0	1	dB
Phase	85	90	95	°
GSM900				

	Min	Typ	Max	Unit
I DC offset / Q DC offset	-6	-4	6	%
Ampl	-1	0	1	dB
Phase	85	90	95	°
GSM1800/GSM1900				
I/Q DC	-6	0.5	6	%
Ampl	-1	0	1	dB
Phase	95	100	110	°

Tx power level tuning (GSM)

Context

Because of variations at the IC (Integrated Circuit) process and discrete component values, the actual transmitter RF gain of each phone is different. Tx power level tuning is used to find out mapping factors called 'power coefficients'. These adjust the GSM transmitter output power to fulfill the specifications.

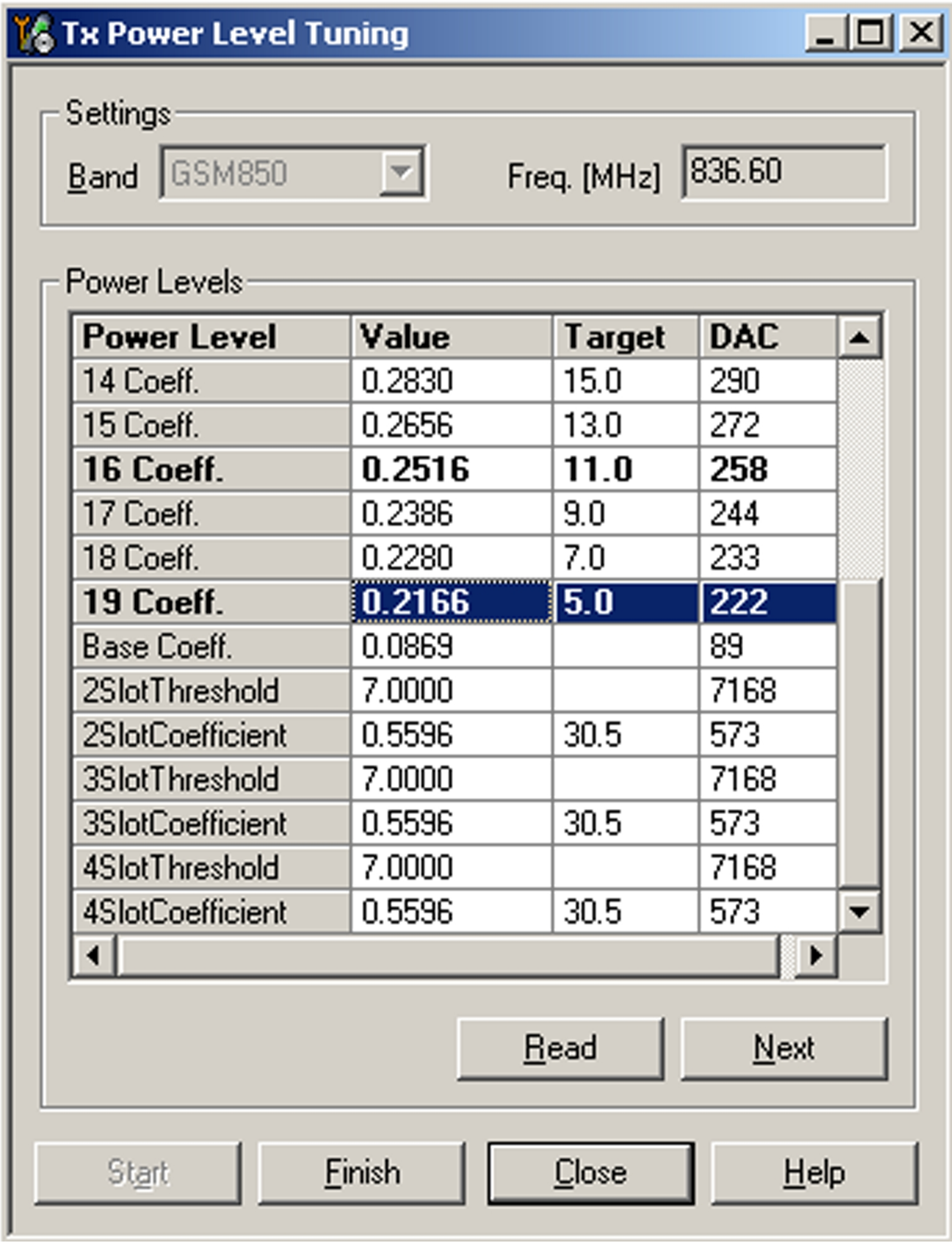
For EDGE transmission, the bias settings of the GSM PA are adjusted in order to improve linearity. This affects the PA gain and hence the power levels have to be aligned separately for EDGE transmission.

Tx power level tuning has to be performed on all GSM bands.

Steps

1. Connect the phone to a spectrum analyzer.
2. Start *Phoenix* service software.
3. From the **Operating mode** drop-down menu, set mode to **Local**.
4. Choose **Tuning**→**GSM**→**Tx Power Level Tuning** .

5. Click **Start.l**



Band GSM850

Freq. [MHz] 836.60

Power Level	Value	Target	DAC
14 Coeff.	0.2830	15.0	290
15 Coeff.	0.2656	13.0	272
16 Coeff.	**0.2516**	**11.0**	**258**
17 Coeff.	0.2386	9.0	244
18 Coeff.	0.2280	7.0	233
19 Coeff.	**0.2166**	**5.0**	**222**
Base Coeff.	0.0869		89
2SlotThreshold	7.0000		7168
2SlotCoefficient	0.5596	30.5	573
3SlotThreshold	7.0000		7168
3SlotCoefficient	0.5596	30.5	573
4SlotThreshold	7.0000		7168
4SlotCoefficient	0.5596	30.5	573

6. Set the spectrum analyzer for power level tuning:

Frequency	Channel frequency: • **836.6 MHz GSM850** • **897.4MHz GSM900** • **1747.8MHz GSM1800** • **1880MHz GSM1900**
Span	0 Hz
Sweep time	2ms
Trigger	Video triggering (-10dBm)
Resolution BW	3MHz

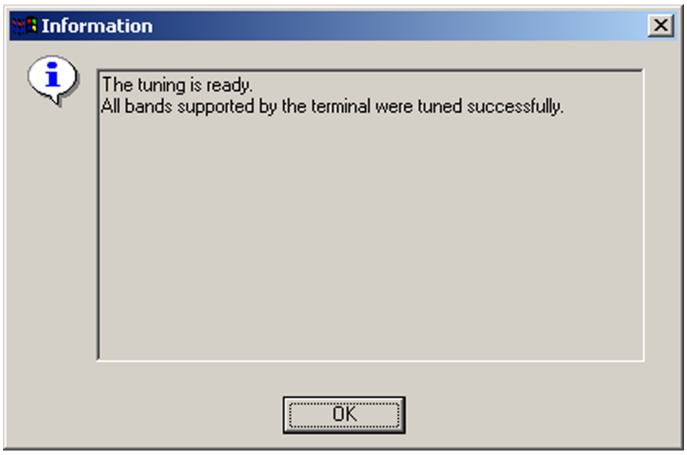
Video BW	3MHz
Reference level offset	sum cable attenuation with module jig attenuation
Reference level	33dBm

A power meter with a peak power detector can be also used. Remember to take the attenuations into account.

7. Adjust power for all bold power levels to correspond the **Target dBm** column by pressing **+** or **–** keys.
8. If all bold power levels are adjusted, click **Next** to continue with **GSM850 EDGE**.
9. Adjust power for all bold power levels to correspond the **Target dBm** column by pressing **+** or **–** keys.

Next actions

Continue tuning the bold power levels of the GSM900, GSM1800 and GSM1900 bands. You will see this message, if finished successfully:



The tuning is ready.
All bands supported by the terminal were tuned successfully.

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8 — System module

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Phone description

Introduction

This chapter describes the baseband module including engine, power management, interfaces, audio etc.

The baseband is based on BB5.0 with a RAPGSM main processor and Retu/Tahvo energy management. All blocks that require high voltage process are in Tahvo and all other in Retu. The RF part is based on the ASIC Ahne.

> **Note:** Not all functions and components are included in all variants. Please refer to the General Information section (page) for more information.

The phone is a slide phone, with one main part and one top board. They are connected with a board-to-board flex.

Main board includes: BB and RF blocks, camera, etc.

Top board includes: LCD display, Bluetooth, FM radio, earpiece, etc.

Key components

Function	Name	Item
Energy management	Retu Tahvo	D2200 N2300
Main processor	RAPGSM	D2800
Memory	Combo: 128 Mbit SDRAM & 256 Mbit NOR flash	D3000
RF ASIC	Ahne	N7505
Front end module	Power amplifier and Antenna Switch	N7520
Antenna	Antenna module assy (in acoustic chamber)	I226
System connector	AV connector mini USB connector	X2030 X2002
Battery	RM-146/147: BL-5B, 3.7 V, 860 mAh RM-174/181: BL-5B, 3.7 V, 820 mAh	
Slide detection	1 hall sensor and 1 permanent magnet	Sensor: N2400 (main-PWB)
Bluetooth	BC4-ROM	N6030
IrDA	GP2W1302YP, 1.152Mbit/s 2.4V	N2600
FM radio	TEA5761, single chip	N6156
IHF Speaker	In acoustic chamber	I227
Earpiece	RDF-07A 32OHM 10.86x7.40.2.2	B1001 (Top board)
Microphone	Clapton	B1000 (Top board)
Vibra	SMD VIBRA MOTOR	M2100
Charger connector	2 mm Nokia charger interface	X2000
Camera	RM-146/147: 1.3 Mpix SMIA85 RM-174/181: VGA SMIA 65	

Function	Name	Item
HWA	**Note:** RM-174/181 does NOT have a hardware accelerator!	D3300 (RM-146/147)
Display	RM-146/147: QVGA 2" RM-174/181: CSTN 128 x 160, 1.8"	
LED driver		N2301
RTC		G2200

PWB overview

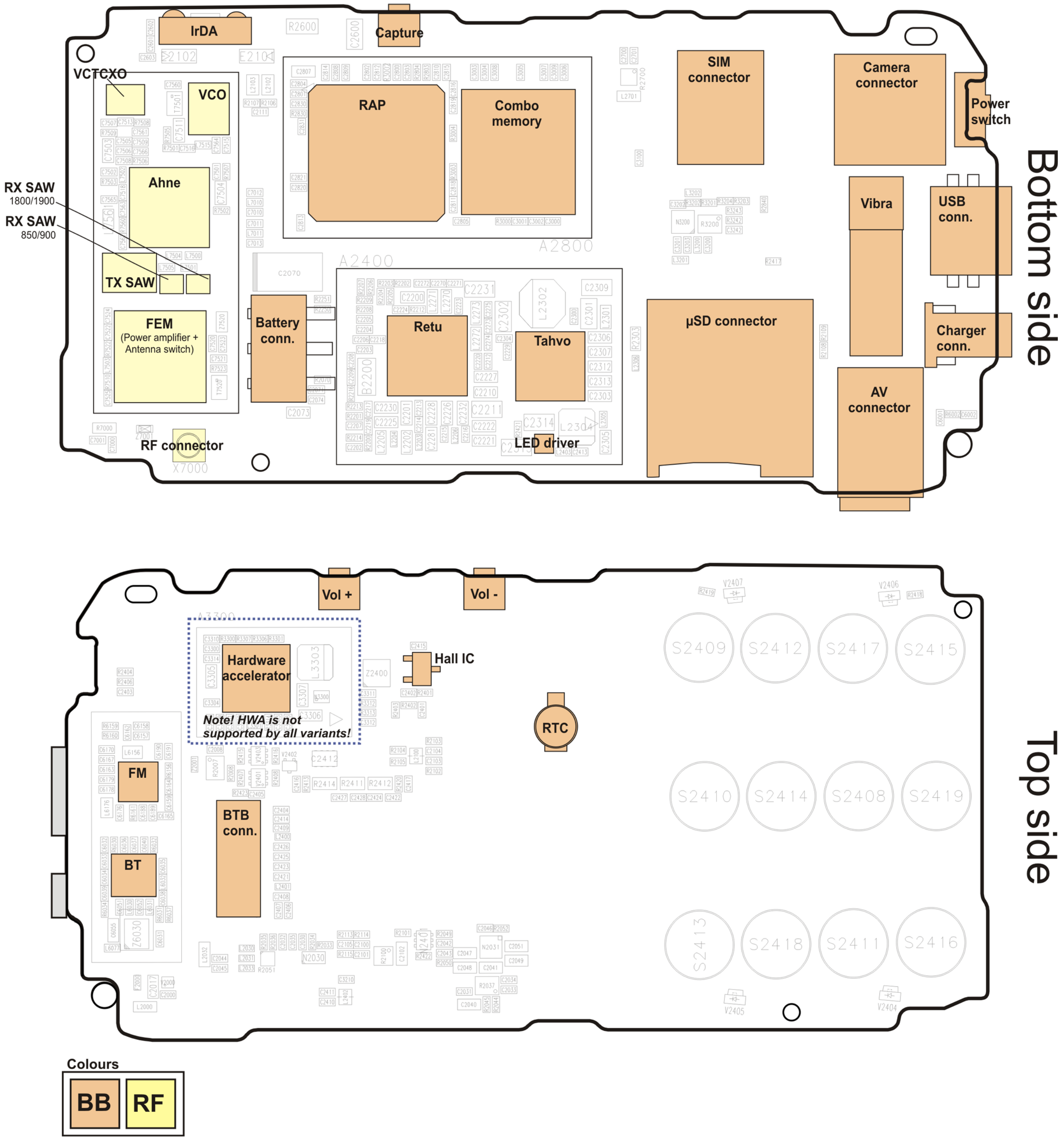

IrDA
Capture
VCTCXO
VCO
RAP
Combo memory
SIM connector
Camera connector
Power switch
RX SAW
1800/1900
RX SAW
850/900
Ahne
TX SAW
FEM
(Power amplifier + Antenna switch)
Battery conn.
Retu
Tahvo
µSD connector
Vibra
USB conn.
Charger conn.
AV connector
LED driver
RF connector
A2400
A2800
Bottom side
Vol +
Vol -
Hardware accelerator
Note! HWA is not supported by all variants!
Hall IC
RTC
FM
BT
BTB conn.
S2409
S2412
S2417
S2415
S2410
S2414
S2408
S2419
S2413
S2418
S2411
S2416
Top side
Colours
BB
RF

Figure 57 PWB overview

System block diagram

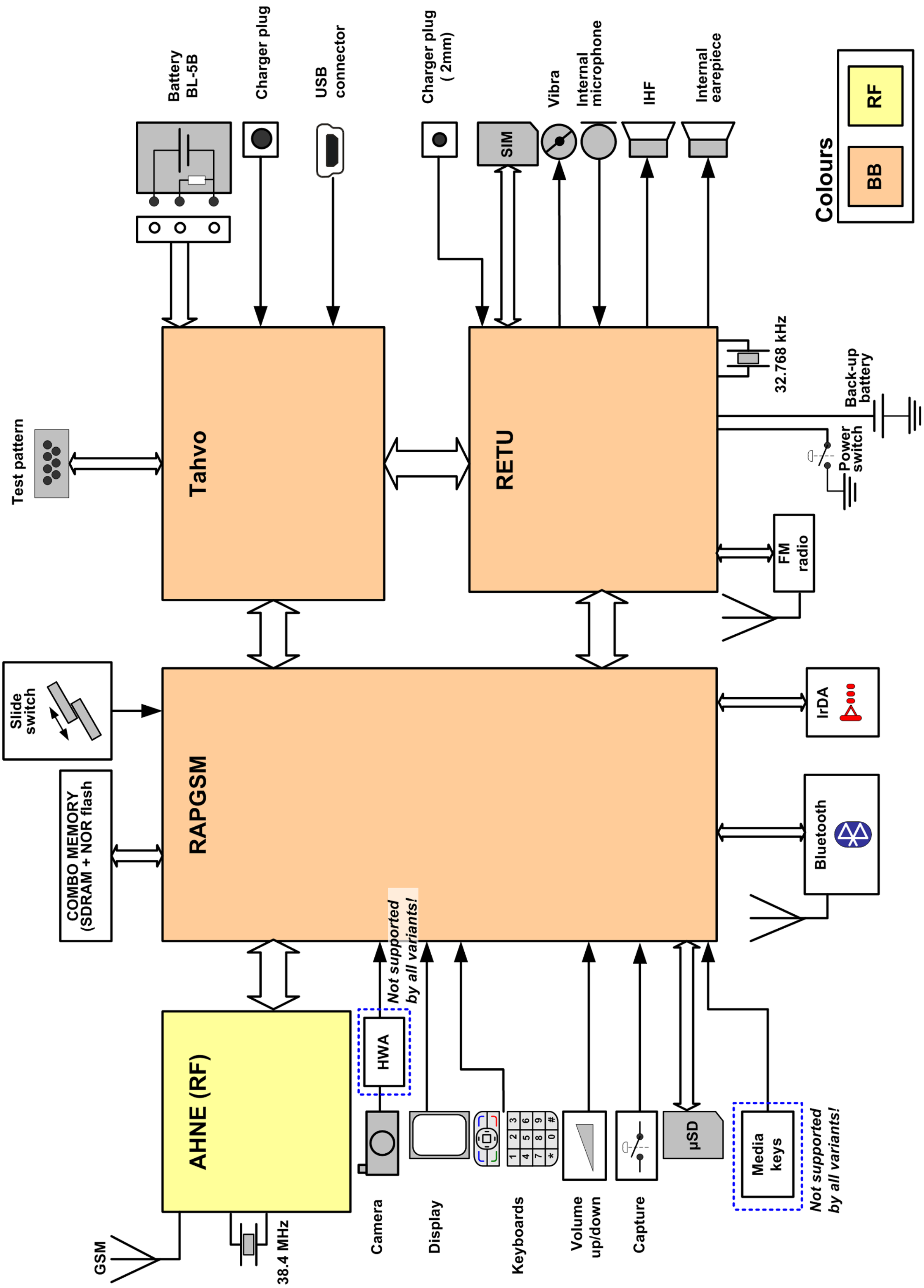

Battery BL-5B
Charger plug
USB connector
Charger plug (2mm)
SIM
Vibra
Internal microphone
IHF
Internal earepiece
Colours
RF
BB
Test pattern
Tahvo
RETU
32.768 kHz
Back-up battery
Power switch
FM radio
Slide switch
COMBO MEMORY (SDRAM + NOR flash)
RAPGSM
IrDA
Bluetooth
Not supported by all variants!
AHNE (RF)
HWA
µSD
Media keys
Not supported by all variants!
GSM
38.4 MHz
Camera
Display
Keyboards
Volume up/down
Capture

Figure 58 System block diagram

Board and module connections

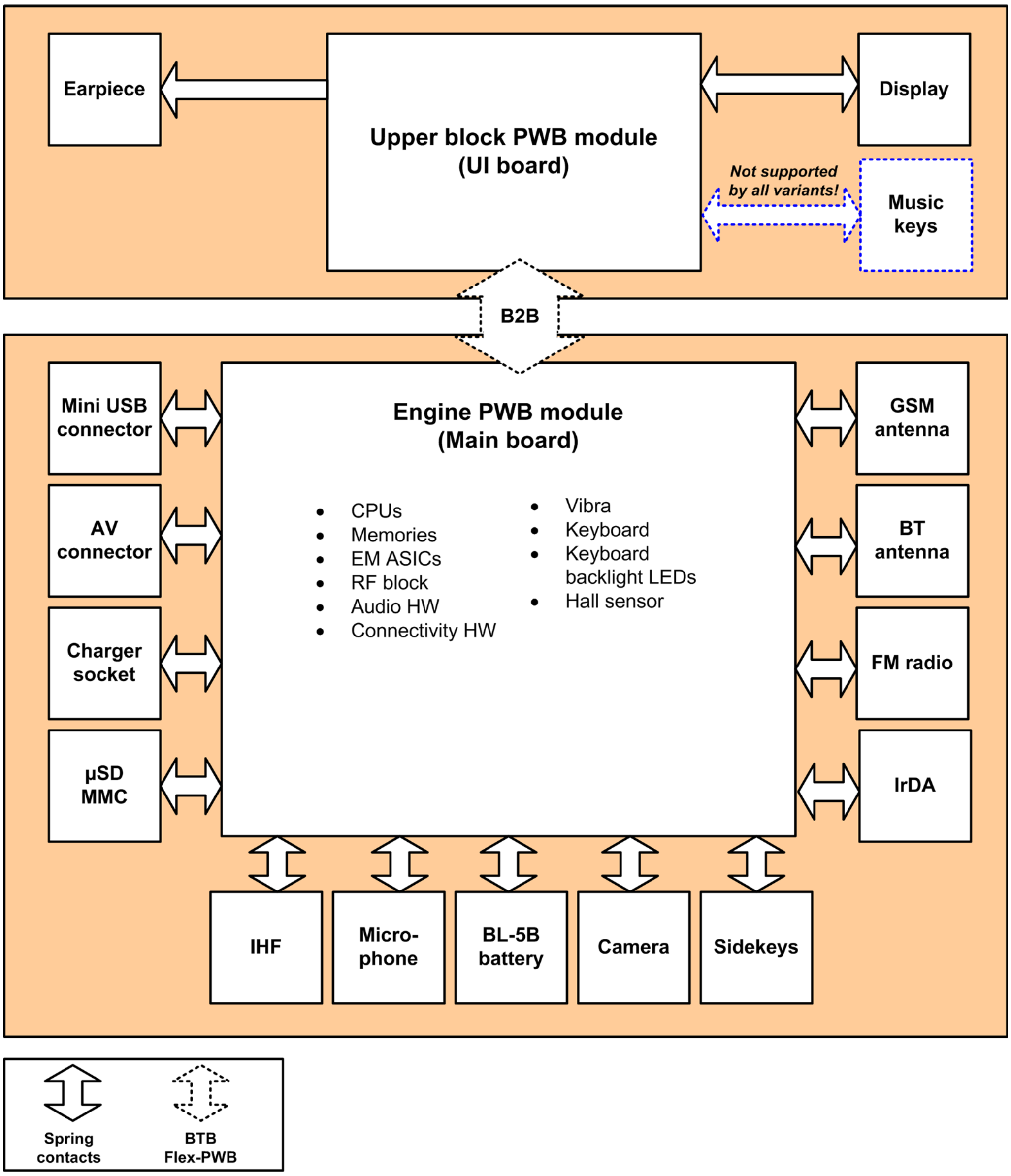

Earpiece
Upper block PWB module
(UI board)
Display
Not supported
by all variants!
Music
keys
B2B
Mini USB
connector
AV
connector
Charger
socket
µSD
MMC
Engine PWB module
(Main board)
CPUs
Memories
EM ASICs
RF block
Audio HW
Connectivity HW
Vibra
Keyboard
Keyboard
backlight LEDs
Hall sensor
GSM
antenna
BT
antenna
FM radio
IrDA
IHF
Micro-
phone
BL-5B
battery
Camera
Sidekeys
Spring
contacts
BTB
Flex-PWB

Figure 59 Board and module connections

Engine

Engine modules

The engine contains

- RF module with Ahne ASIC
- Main processor with integrated memory (Baseband)
- Energy management - Retu and Tahvo (Baseband)
- SDRAM and NOR flash memories

RF engine

The RF module performs the high frequency operations of the engine for GSM. In both transmitter and receiver, the modulator and demodulator operate at the channel frequency.

The core components of the RF module are:

- Ahne RF ASIC (application specific integrated circuit)
- Front end module (FEM) module (Power amplifier and Antenna switch)

The RF engine also includes:

- Voltage controlled oscillators (VCO and VCTCXO)
- SAW filters

The baseband section controls the RF module through the serial bus, RFBus. This passes information about eg. frequency band and mode of operation. Ahne RF ASIC controls the mode of operation, and further sends control signals to the front end module.

In addition to the RFBus there are other interface signals for the power control loop, VCTCXO control and for the modulated waveforms.

Main processor

The main processor in this device is RAPGSM, a BB5.0 ASIC.

Some of its interfaces, processors and controllers are:

- General purpose UARTs
- Processor modules
- I2C (between ICs) interface
- GSM coder
- Interfaces to user interface, SIM and MMC
- Accessory interface
- Handling of RF-BB interface
- I/O voltage = 1.8 V, Core voltage <1.8 V

Energy management

Two ASICs manages the energy in the phone; Retu and Tahvo. Together they cover the analogue audio and energy management function needs.

Tahvo

All blocks that need a special silicon process are included in Tahvo.

Tahvos main features are:

- Energy management control
- Supply voltage generation
- Charge control
- Digital core supply
- Current control for LED supply

Retu

The blocks that do not have special needs are included in Retu.

Retu controls for example:

- Audio block
- SIM
- FM radio

Modes of operation

The functional behavior can be divided into seven different states. Each of these states will affect the general functionality of the phone:

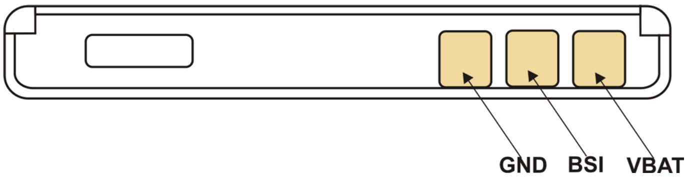
- No supply
- Backup
- Power off
- Reset
- Power on
- Deep sleep

Battery and charging

Battery

- Type: BL-5B, Li-Ion
- Capacity: 860 mAh (RM-146/147) and 820 mAh (RM-174/181)
- BSI resistor nominal value: 75 kΩ

Battery temperature is measured on the NTC on the main board.



Battery connector

The battery connector has three poles:

- BSI (Battery size indicator)
- GND (Ground)
- VBAT (Battery voltage)

The BSI line is used to recognize the battery capacity by a battery internal pull down resistor.

Charging

This phone is charged through the smaller Nokia standard interface (2.0 mm plug). The old standard charger (3.5 mm) can be used together with the CA-44 charger adapter.

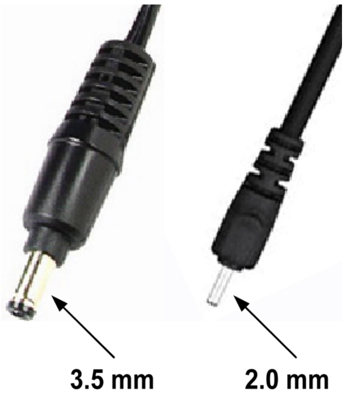


Figure 60 Old (left) and new (right) charger plugs

Charging is controlled by energy management, and external components are needed to protect the baseband module against EMC, reverse polarity and transient frequency deviation.

Interfaces

FM radio

This phone uses a single-chip electronically tuned FM stereo radio with low voltage application.

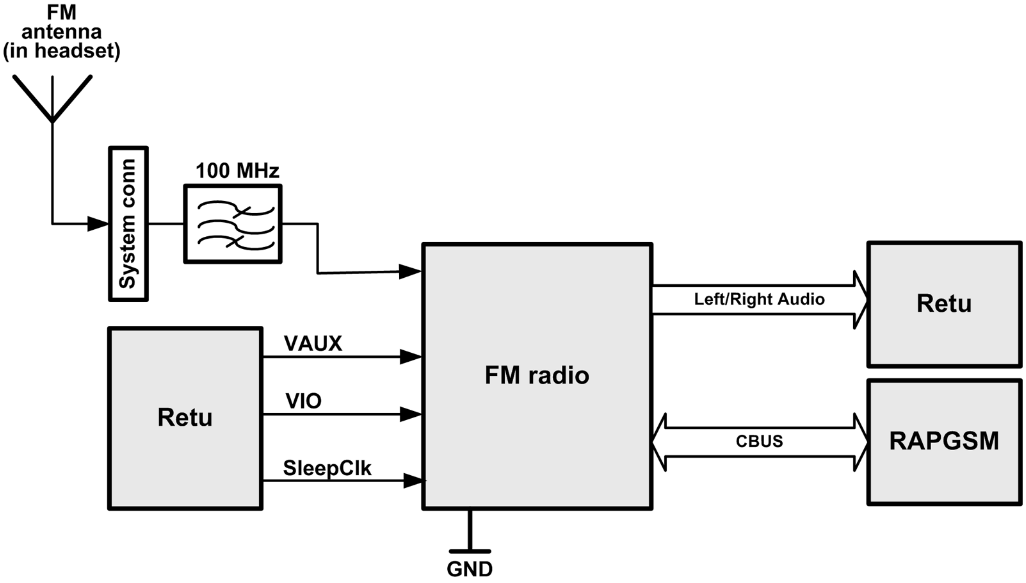

FM
antenna
(in headset)
System conn
100 MHz
Retu
VAUX
VIO
SleepClk
FM radio
GND
Left/Right Audio
Retu
CBUS
RAPGSM

Figure 61 FM radio interface

Camera

Note: Depending on the variant, the camera interface may vary. Please check the type designator of the phone carefully!

Camera interface for RM-146/147

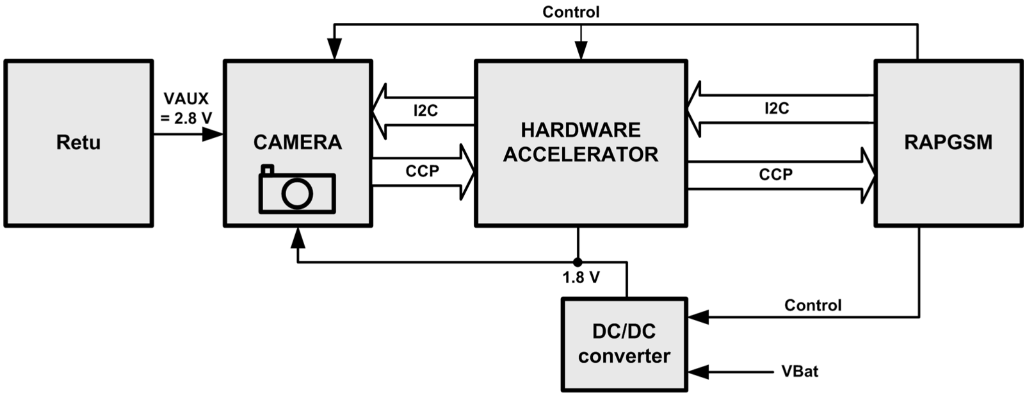

Control
Retu
VAUX
= 2.8 V
CAMERA
I2C
CCP
HARDWARE
ACCELERATOR
I2C
CCP
RAPGSM
1.8 V
Control
DC/DC
converter
VBat

Figure 62 RM-146/147 Camera interface

This phone has a **1.3 Megapixel** camera, supported by a hardware accelerator.

Camera interface for RM-174/181

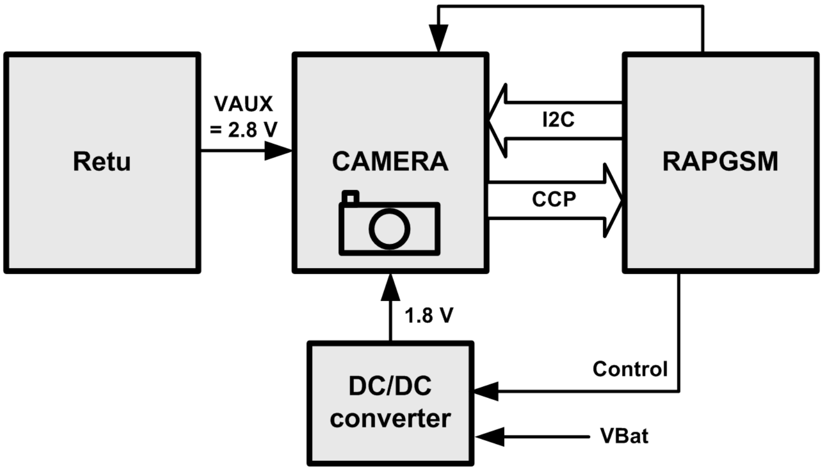

Retu
VAUX
= 2.8 V
CAMERA
I2C
CCP
RAPGSM
1.8 V
DC/DC
converter
Control
VBat

Figure 63 RM-174/181 Camera interface

This phone has a **VGA** camera. There is no hardware accelerator (HWA); the camera is directly connected to the baseband.

SIM

The SIM interface is the electrical interface between the SIM card and the mobile phone engine.

The data communication between the SIM card and the phone is asynchronous half duplex.

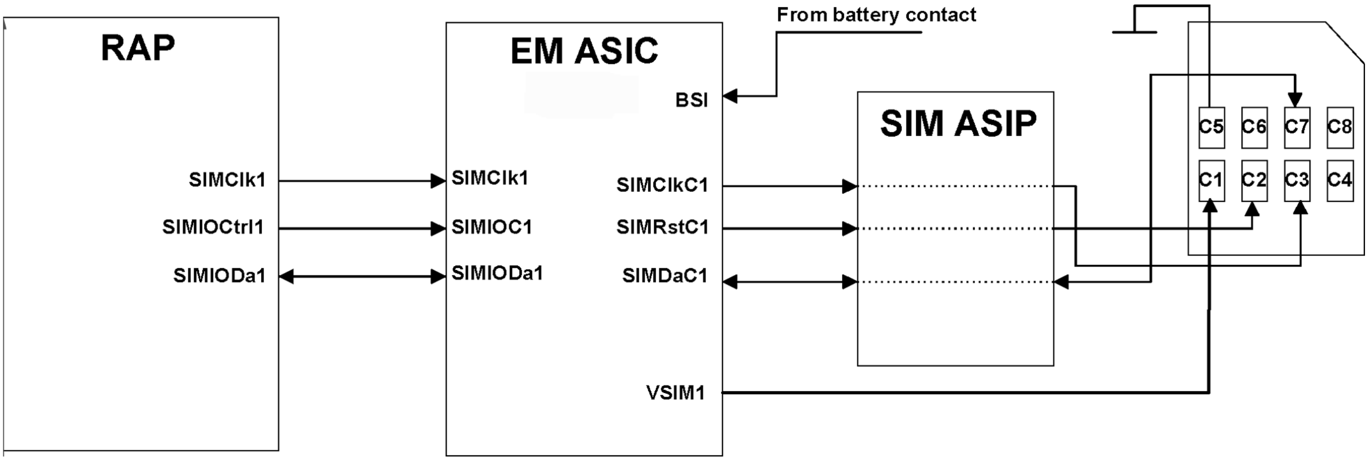

RAP
SIMClk1
SIMIOCtrl1
SIMIODa1
EM ASIC
BSI
SIMClk1
SIMIOC1
SIMIODa1
SIMClkC1
SIMRstC1
SIMDaC1
VSIM1
From battery contact
SIM ASIP
C5
C6
C7
C8
C1
C2
C3
C4

Figure 64 SIM interface connections

SIM Logic level shifting

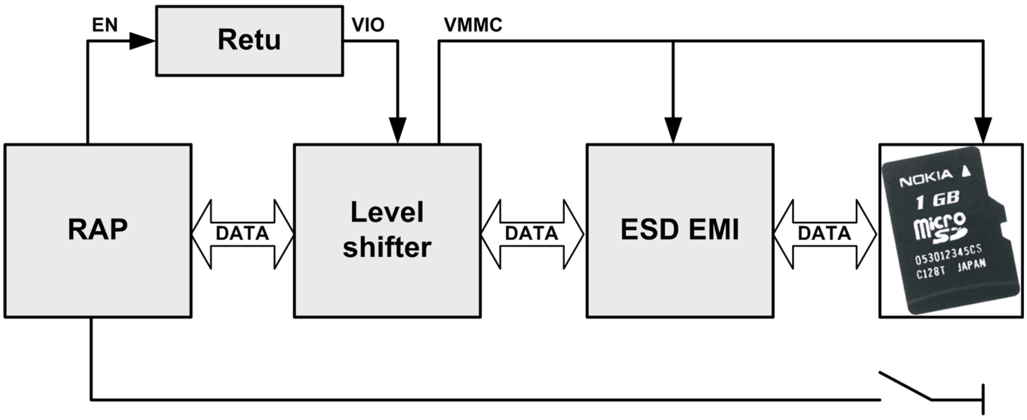
The SIM interface can support 3V and 1.8V SIM cards.

SIM Power up/down

The SIM power up/down sequence is generated in Retu. This means that Retu generates the reset switch (RST) signal to the SIM. In addition, the SIMCardDet signal is connected to Retu.

The SIM interface is powered up when the SIMCardDet signal indicates “card in”.

µSD card interface



The µSD card is connected to the engine by an external level shifter and ESD protection filter. Supplied voltages:

- VMMC: 2.85 V (from level shifter)
- VIO: 1.8 V (from Retu)

The card removal is detected by a push detect switch.

User interface

Display

The display unit comprises a parallel interface.

Keyboard

There are two key pads; one on the top board and one on the main board. Also, there are several other devoted keys;

- Numeric keys (Main board)
- Navigation key, Soft keys, Start, and End (Top board)
- Power switch (Main board)
- Camera capture key (Main board)
- Volume up and down (Main board)
- 3 media keys (Top board)

Note: Media keys are not supported by all variants.

Display and keypad backlight

There are three sets of LEDs (Light emitting diodes) illuminating the display and the keypads:

- Display LEDs, 4pcs
- Main keypad on PWB, 4 pcs, blue colour
- Top keypad on UI board, 2 pcs, white colour

All sets share the same driver. None of the keypads can be illuminated without the LCD backlight being turned on.

Slide switch

This is a slide phone that wakes up when it slides open. A switch detects the position of the slide. It is implemented with a Hall IC and a magnet.

The output from the Hall IC is high (2.78 V) when the slide is open.

Audio concept

Audio concept

The functional core of the audio hardware is built around two ASICs; RAP engine and Retu.

Retu provides an interface for the trancducers and the AV connector.

There are three audio transducers:

- 1 dynamic earpiece
- 1 dynamic speaker
- 1 microphone module

Retu also provides an output for the vibra motor.

All external audio accessories are connected to the specific audio connector.

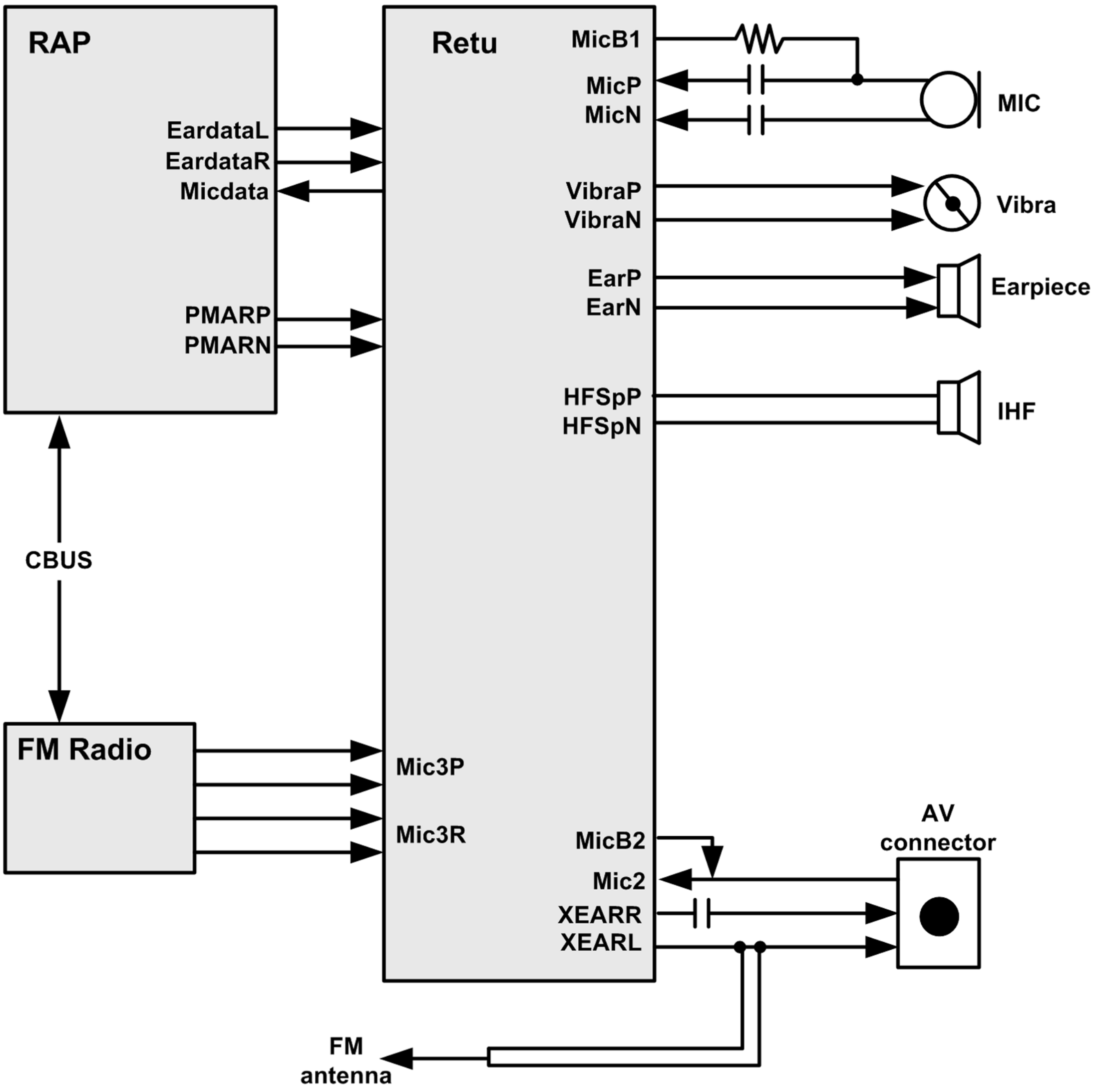

RAP
EardataL
EardataR
Micdata
PMARP
PMARN
CBUS
FM Radio
Retu
MicB1
MicP
MicN
VibraP
VibraN
EarP
EarN
HFSpP
HFSpN
Mic3P
Mic3R
MicB2
Mic2
XEARR
XEARL
MIC
Vibra
Earpiece
IHF
AV
connector
FM
antenna

Figure 65 Audio block diagram

Internal audio

The internal audio components are used in these modes:

	Hand portable (HP) mode	Internal hands free (IHF) mode
Microphone	X	X
Earpiece	X	
Speaker		X

Connections

AV connector

Headsets and other galvanic accessories are connected to the specific audio input. The accessory mode is automatically enabled/disabled when a dedicated accessory is connected/disconnected.

> **Note:** When testing external audio through the audio connector, make sure that the specific accessory can be used with this phone!

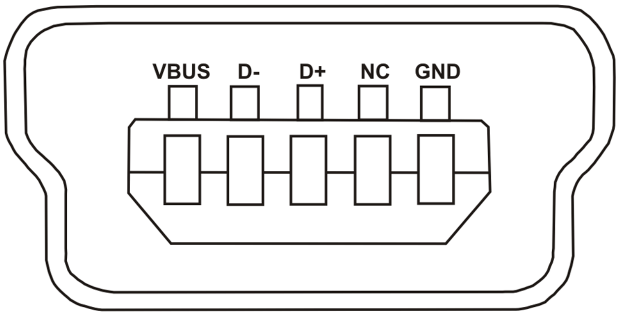
USB

USB (Universal Serial Bus) provides a wired connectivity between a PC and peripheral devices. It is a differential serial bus.

USB 2.0 is supported with full speed (12 Mbps).

Hot swap is supported, which means that USB devices may be plugged in/out at any time.

This phone is provided with a specific connector for mini USB.



Bluetooth

Bluetooth provides a fully digital link for communication between a master unit and one or more slave units.

This bluetooth solution is a single chip solution.

Bluetooth connects to RAPGSM on the GENIO and GPIO busses.

The Bluetooth module is provided with power from VBat.

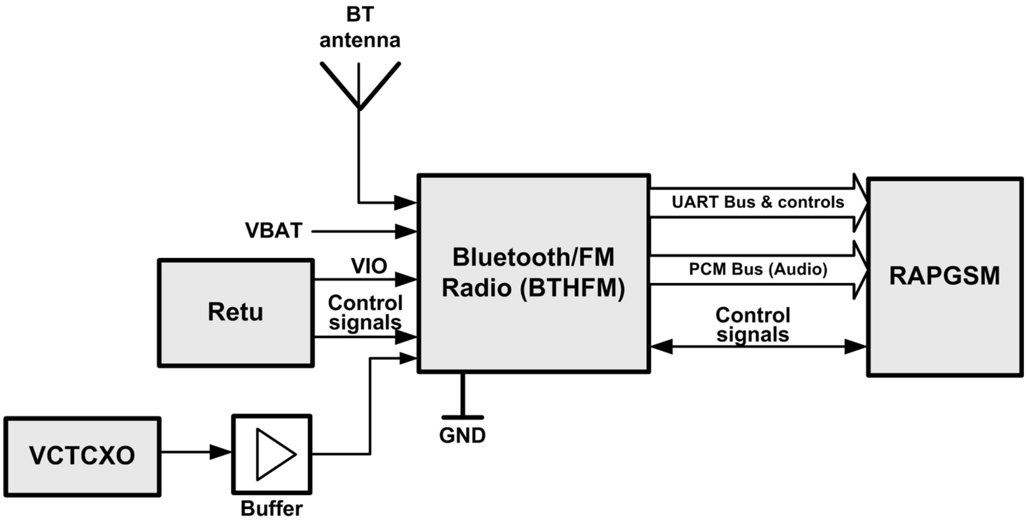

BT
antenna
VBAT
Retu
VIO
Control signals
Bluetooth/FM Radio (BTHFM)
UART Bus & controls
PCM Bus (Audio)
Control signals
RAPGSM
GND
VCTCXO
Buffer

Figure 66 Bluetooth interface block diagram

IrDA

IrDA is a fully digital peer-to-peer data link between IrDA units. The link is based on the serial transmission of data as pulses of infrared light. The IrDA module contains both RX part and TX part.

The IrDA interface is integrated in RAPGSM.

Datarate: 1.152 Mbit

Max. operating distance: 1 m

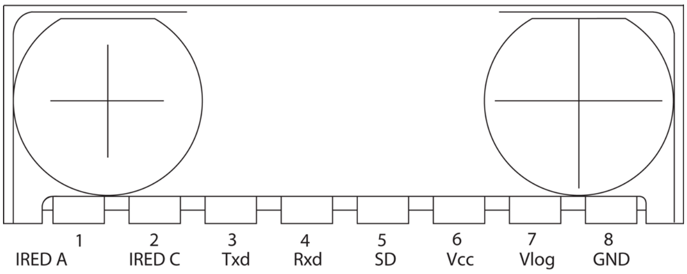

1 IRED A
2 IRED C
3 Txd
4 Rxd
5 SD
6 Vcc
7 Vlog
8 GND

Figure 67 IR module pin ordering

Technical specifications

General specifications

Unit	Dimension (mm)	Weight (g)	Volume (cc)
Transceiver with BL-5B 820 mAh Li-Ion battery pack	92.4 x 48.2 x 20.7	99 g	85 cc
Transceiver with BL-5B 860 mAh Li-Ion battery pack	92.4 x 48.2 x 20.7	99 g	85 cc

Battery endurance

Battery	Talk time	Standby time	Music time
BL-5B 820 mAh Li-ion	3 - 3.5 hours	Up to 300 hours	> 10 hours
BL-5B 860 mAh Li-ion	3 - 3.5 hours	Up to 300 hours	> 10 hours

Note: Variation in operation times will occur depending on SIM card, network settings and usage. Talk time is increased by up to 30% if half rate is active, and reduced by 5% if enhanced full rate is active.

Environmental conditions

Temperature

Temperature range	Min ºC	Max ºC
Operational (all specs met)	-5	+55
Functional (reduced performance)	-30	+70
Storage	-30	+85

The HW module complies with the SPR4 Operating Conditions.

Humidity

Relative humidity range is 5...95%.

The hardware module is not protected against water. Condensed or splashed water might cause malfunction. Any submerge of the phone will cause permanent damage. Long-term high humidity, with condensation, will cause permanent damage because of corrosion.

The hardware module complies with the SPR4 Operating Conditions.

Electrical characteristics

Table 18 Normal and extreme voltages

Voltage	Voltage (V)	Condition
General conditions		
Nominal voltage	4.0	
Lower extreme voltage	3.06	a
Higher extreme voltage	4.2	b
Min operating voltage		
Vcoff+	3. 1 ± 0,1	Off to on
x	2. 8 ± 0,1	On to off

a. ADC settings in the SW might shutdown the phone above this value.

b. During fast charging of an empty battery, this voltage might exceed this value. Voltages between 4.20 and 4.60 might appear for a short while.

Main RF characteristics

Table 19 Channel numbers and frequencies

System	Channel number	TX frequency	RX frequency	Unit
GSM850	128 <= n <= 251	F = 824.2 + 0.2*(n - 128)	F = 869.2 + 0.2*(n-128)	MHz
GSM900	0 < =n <= 124	F = 890 + 0.2*n	F = 935 + 0.2*n	MHz
	975 <= n <= 1023	F = 890 + 0.2* (n - 1024)	F = 935 + 0.2*(n -1024)	MHz
GSM1800	512 <= n <= 885	F = 1710.2 + 0.2* (n - 512)	F = 1805.2 + 0.2*(n-512)	MHz
GSM1900	512 <= n <= 810	F = 1850.2 + 0.2* (n - 512)	F = 1930.2 + 0.2*(n-512)	MHz

Table 20 Main RF characteristics

Parameter	Unit and value
Cellular systems	GSM850/EGSM900/GSM1800/GSM1900
RX Frequency range	GSM850: 869 ... 894 MHz
	EGSM900: 925 ... 960 MHz
	GSM1800: 1805...1880 MHz
	GSM1900: 1930...1990 MHz
TX Frequency range	GSM850: 824 ... 849 MHz
	EGSM900: 880 ... 915 MHz
	GSM1800: 1710 ...1785 MHz
	GSM1900: 1850...1910 MHz
Duplex spacing	GSM850: 45 MHz
	EGSM900: 45 MHz
	GSM1800: 95 MHz
	GSM1900: 80 MHz
Channel spacing	200 kHz
Number of RF channels	GSM850: 124
	EGSM900: 174
	GSM1800: 374
	GSM1900: 300

Parameter	Unit and value
Output Power	GSM850: GSMK 5...33 dBm
	GSM850: 8-PSK 5...26.5 dBm
	EGSM900: GSMK 5...33 dBm
	EGSM900: 8-PSK 5...26.5 dBm
	GSM1800: GSMK 0...30 dBm
	GSM1800: 8-PSK 0...25.5 dBm
	GSM1900: GSMK 0...30 dBm
	GSM1900: 8-PSK 0...25.5 dBm
Number of power levels GMSK	GSM850: 15
	EGSM900: 15
	GSM1800: 16
	GSM1900: 16
Number of power levels 8-PSK	GSM850: 12
	EGSM900: 12
	GSM1800: 14
	GSM1900: 14

Table 21 Transmitter characteristics

Item	Values
Type	Direct conversion, nonlinear, FDMA/TDMA
LO frequency range	GSM850: 3296...3576 MHz (4 x TX freq)
	EGSM900: 3520...3660 MHz (4 x TX freq)
	GSM1800: 3420...3570 MHz (2 x TX freq)
	GSM1900: 3700...3820 MHz (2 x TX freq)
Output power (GSM850/EGSM900/GSM1800/ GSM1900)	GMSK 33/33/30/30 dBm 8-PSK 26.5/26.5/25.5/25.5 dBm
Gain control range	min. 30 dB
Phase error (RMS/peak), GMSK	5 deg./20 deg. peak
EVM (RMS/peak), 8-PSK	10%/30%

Table 22 Receiver characteristics

Item	Values
Type	Direct conversion, Linear, FDMA/TDMA

Item	Values
LO frequencies	GSM850: 3476..3576 MHz (4 x RX freq)
	EGSM900: 3700...3840 MHz (4 x RX freq)
	GSM1800: 3610...3760 MHz (2 x RX freq)
	GSM1900: 3860...3980 MHz (2 x RX freq)
Typical 3 dB bandwidth	+/- 91 kHz
Sensitivity	min. - 102 dBm (normal condition)
Total typical receiver voltage gain (from antenna to RX ADC)	86 dB
Receiver output level (RF level -95 dBm)	40 mVpp, single-ended I/Q signals to RX ADCs

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9 — Schematics

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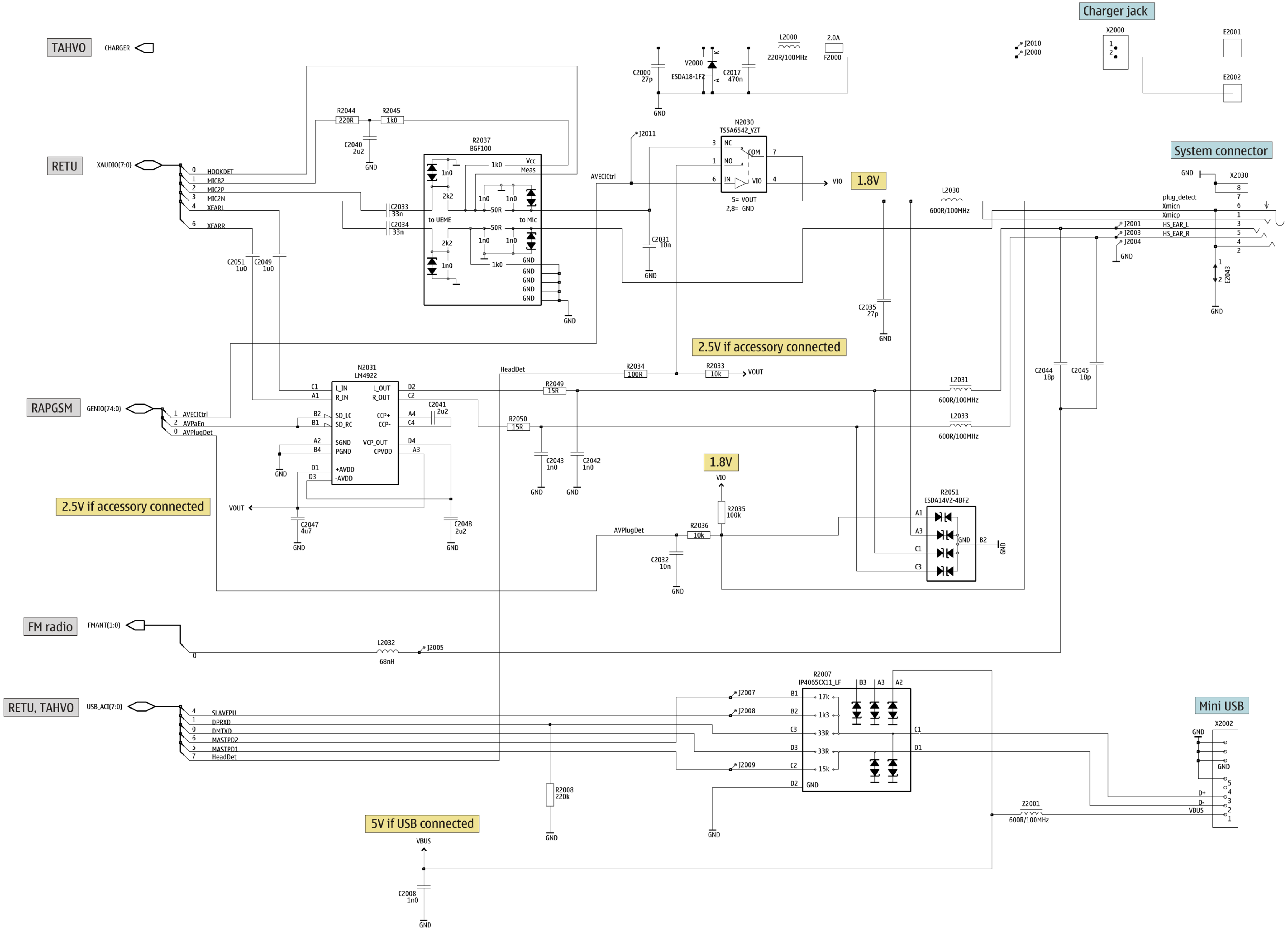
Table of Contents

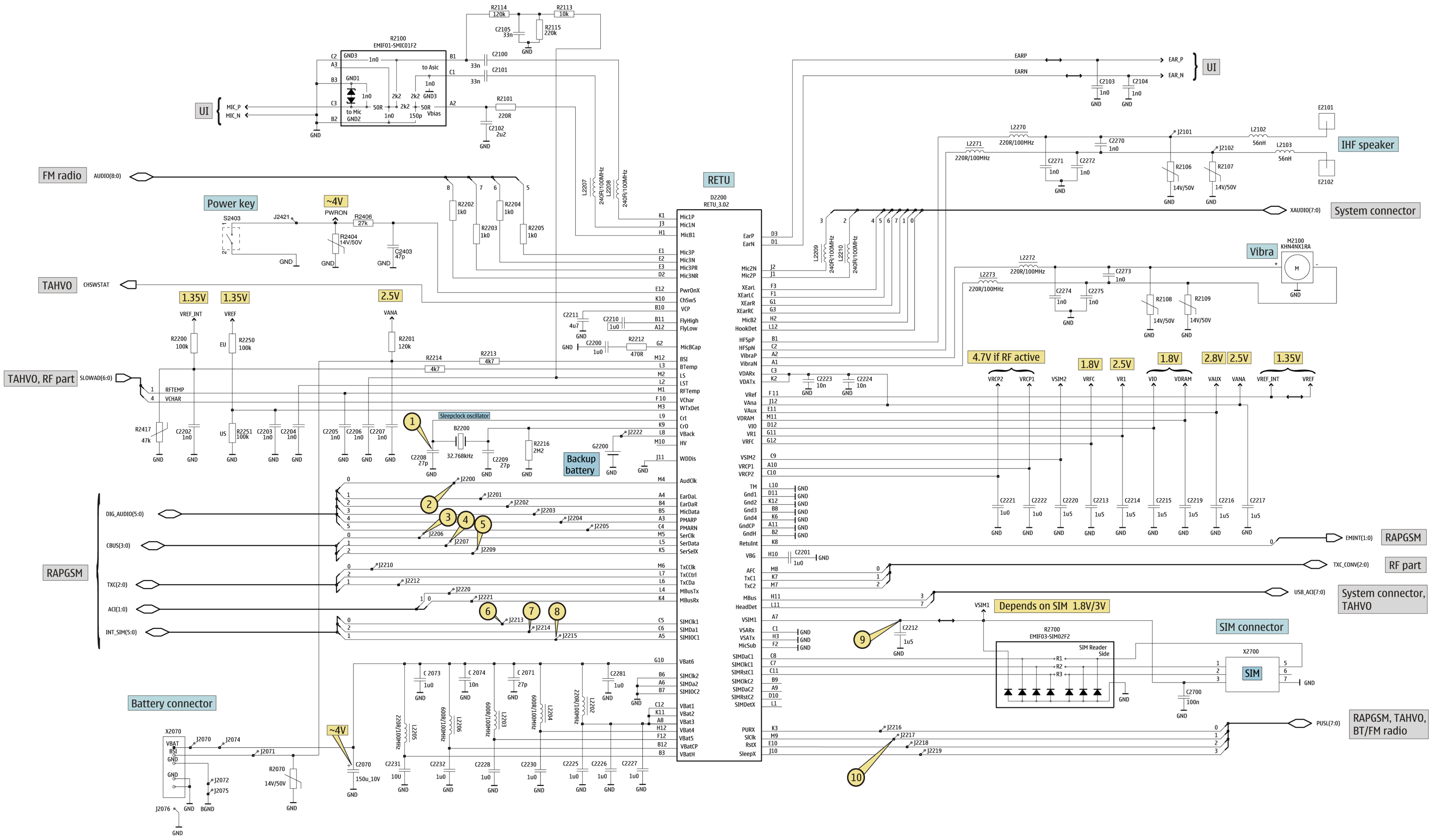
Schematics..9–4

Schematics

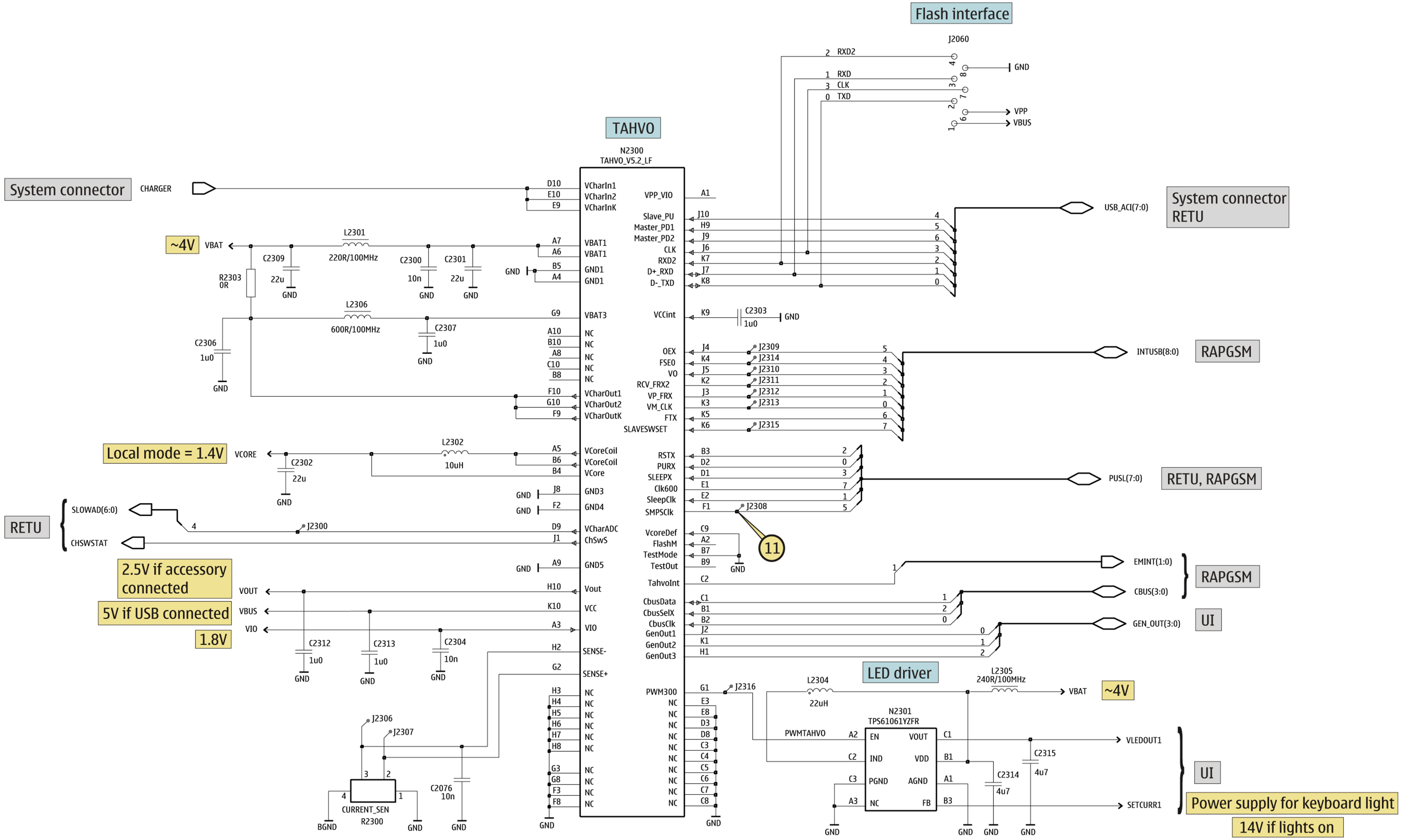
System connector


TAHVO
CHARGER
C2000
27p
GND
V2000
ESDA18-1F2
C2017
470n
L2000
220R/100MHz
2.0A
F2000
J2010
J2000
Charger jack
X2000
1
2
E2001
E2002
RETU
XAUDIO(7:0)
0 HOOKDET
1 MICB2
2 MIC2P
3 MIC2N
4 XEARL
6 XEARR
R2044
220R
R2045
1k0
C2040
2u2
GND
R2037
BGF100
Vcc
Meas
1k0
1n0
2k2
50R
to UEME
to Mic
C2033
33n
C2034
33n
C2051
1u0
C2049
1u0
J2011
AVECICtrl
C2031
10n
N2030
TS5A6542_YZT
NC
NO
IN
COM
VIO
3
1
6
7
4
5= VOUT
2,8= GND
VIO
1.8V
L2030
600R/100MHz
C2035
27p
System connector
X2030
plug_detect
Xmicn
Xmicp
HS_EAR_L
HS_EAR_R
J2001
J2003
J2004
8
7
6
1
3
5
4
2
E2043
2.5V if accessory connected
R2034
100R
R2033
10k
VOUT
HeadDet
C2044
18p
C2045
18p
RAPGSM
GENIO(74:0)
1 AVECICtrl
2 AVPaEn
0 AVPlugDet
N2031
LM4922
L_IN
R_IN
L_OUT
R_OUT
SD_LC
SD_RC
CCP+
CCP-
SGND
PGND
VCP_OUT
CPVDD
+AVDD
-AVDD
C1
A1
B2
B1
A2
B4
D1
D3
D2
C2
A4
C4
D4
A3
C2041
2u2
R2049
15R
R2050
15R
C2043
1n0
C2042
1n0
L2031
600R/100MHz
L2033
600R/100MHz
2.5V if accessory connected
VOUT
C2047
4u7
C2048
2u2
1.8V
VIO
R2035
100k
R2036
10k
AVPlugDet
C2032
10n
R2051
ESDA14V2-4BF2
A1
A3
C1
C3
GND
B2
FM radio
FMANT(1:0)
0
L2032
68nH
J2005
RETU, TAHVO
USB_ACI(7:0)
4 SLAVEPU
1 DPRXD
0 DMTXD
6 MASTPD2
5 MASTPD1
7 HeadDet
J2007
J2008
J2009
R2007
IP4065CX11_LF
B3
A3
A2
B1
B2
C3
D3
C2
D2
17k
1k3
33R
33R
15k
C1
D1
R2008
220k
Mini USB
X2002
D+
D-
VBUS
5
4
3
2
1
Z2001
600R/100MHz
5V if USB connected
VBUS
C2008
1n0

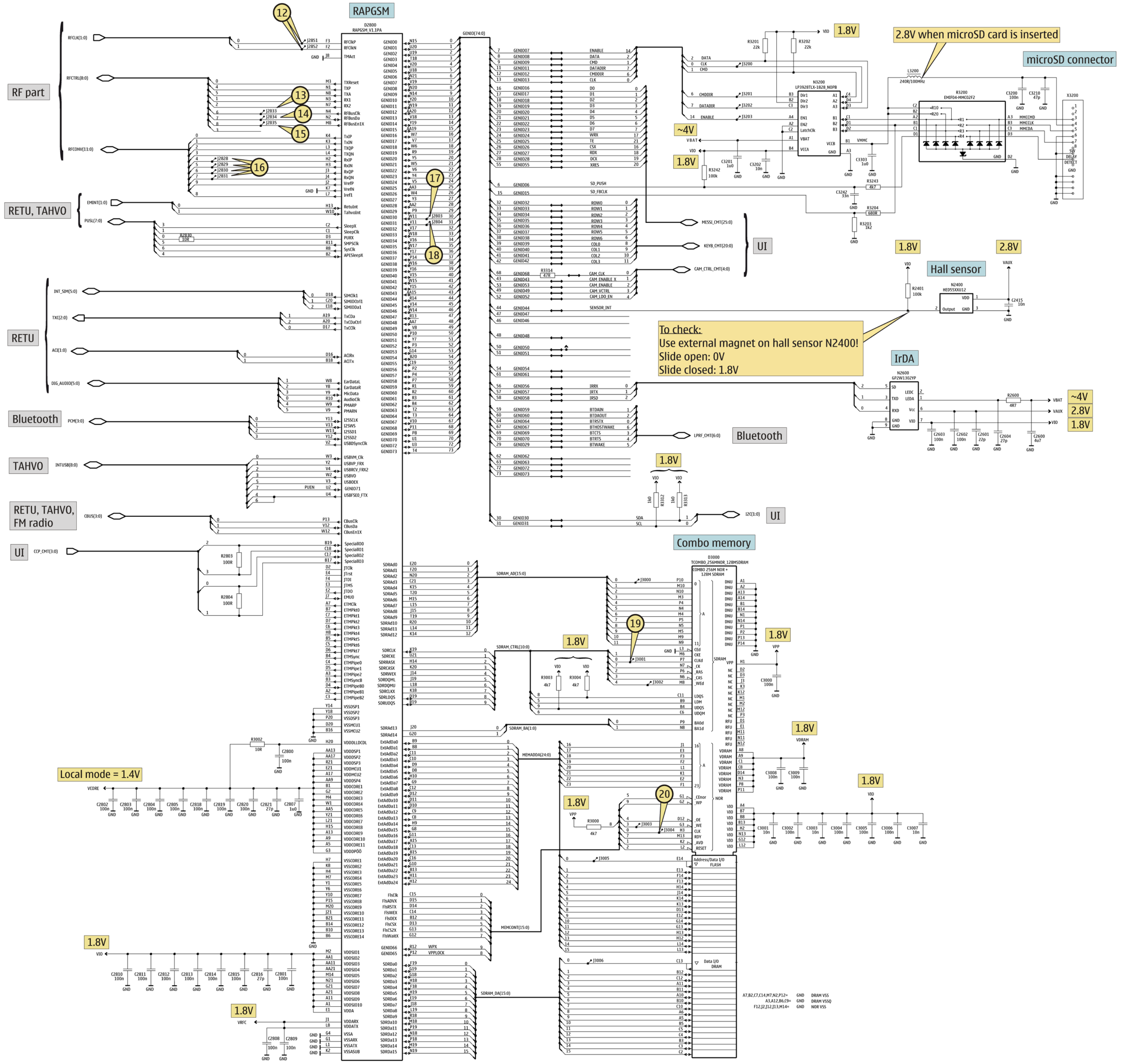
RETU


UI
MIC_P
MIC_N
R2100
EMIF01-SMIC01F2
to Asic
to Mic
Vbias
R2114 120k
R2113 10k
R2115 220k
C2105 33n
C2100 33n
C2101 33n
R2101 220R
C2102 2u2
FM radio
AUDIO(8:0)
Power key
S2403
J2421
~4V
PWRON
R2406 27k
R2404 14V/50V
C2403 47p
TAHVO
CHSWSTAT
1.35V
1.35V
2.5V
VREF_INT
VREF
VANA
R2200 100k
R2250 100k
R2201 120k
R2214 4k7
R2213 4k7
TAHVO, RF part
SLOWAD(6:0)
RFTEMP
VCHAR
R2417 47k
C2202 1n0
R2251 100k
C2203 1n0
C2204 1n0
C2205 1n0
C2206 1n0
C2207 1n0
Sleepclock oscillator
B2200
32.768kHz
C2208 27p
C2209 27p
R2216 2M2
G2200
Backup battery
J2222
RETU
D2200
RETU_3.02
L2207
L2208
240R/100MHz
R2202 1k0
R2203 1k0
R2204 1k0
R2205 1k0
C2211 4u7
C2210 1u0
C2200 1u0
R2212 470R
RAPGSM
DIG_AUDIO(5:0)
CBUS(3:0)
TXC(2:0)
ACI(1:0)
INT_SIM(5:0)
J2200
J2201
J2202
J2203
J2204
J2205
J2206
J2207
J2209
J2210
J2212
J2220
J2221
J2213
J2214
J2215
1
2
3
4
5
6
7
8
9
10
Battery connector
X2070
VBAT
BSI
J2070
J2074
J2071
J2072
J2075
J2076
R2070 14V/50V
C2070 150u_10V
C2073 1u0
C2074 10n
C2071 27p
C2281 1u0
C2231 10U
C2232 1u0
C2228 1u0
C2230 1u0
C2225 1u0
C2226 1u0
C2227 1u0
L2205 220R/100MHz
L2206 600R/100MHz
L2203 600R/100MHz
L2204 600R/100MHz
L2202 220R/100MHz
EARP
EARN
EAR_P
EAR_N
C2103 1n0
C2104 1n0
L2270 220R/100MHz
L2271 220R/100MHz
C2270 1n0
C2271 1n0
C2272 1n0
J2101
J2102
R2106 14V/50V
R2107 14V/50V
L2102 56nH
L2103 56nH
E2101
E2102
IHF speaker
XAUDIO(7:0)
System connector
L2209
L2210
240R/100MHz
L2272 220R/100MHz
L2273 220R/100MHz
C2273 1n0
C2274 1n0
C2275 1n0
R2108 14V/50V
R2109 14V/50V
Vibra
M2100
KHN4NX1RA
C2223 10n
C2224 10n
4.7V if RF active
1.8V
2.5V
1.8V
2.8V
2.5V
1.35V
VRCP2
VRCP1
VSIM2
VRFC
VR1
VIO
VDRAM
VAUX
VANA
VREF_INT
VREF
C2221 1u0
C2222 1u0
C2220 1u5
C2213 1u5
C2214 1u5
C2215 1u5
C2219 1u5
C2216 1u5
C2217 1u5
EMINT(1:0)
RAPGSM
C2201 1u0
TXC_CONV(2:0)
RF part
USB_ACI(7:0)
System connector, TAHVO
VSIM1
Depends on SIM 1.8V/3V
C2212 1u5
R2700
EMIF03-SIM02F2
SIM Reader Side
SIM connector
X2700
SIM
C2700 100n
J2216
J2217
J2218
J2219
PUSL(7:0)
RAPGSM, TAHVO, BT/FM radio
GND

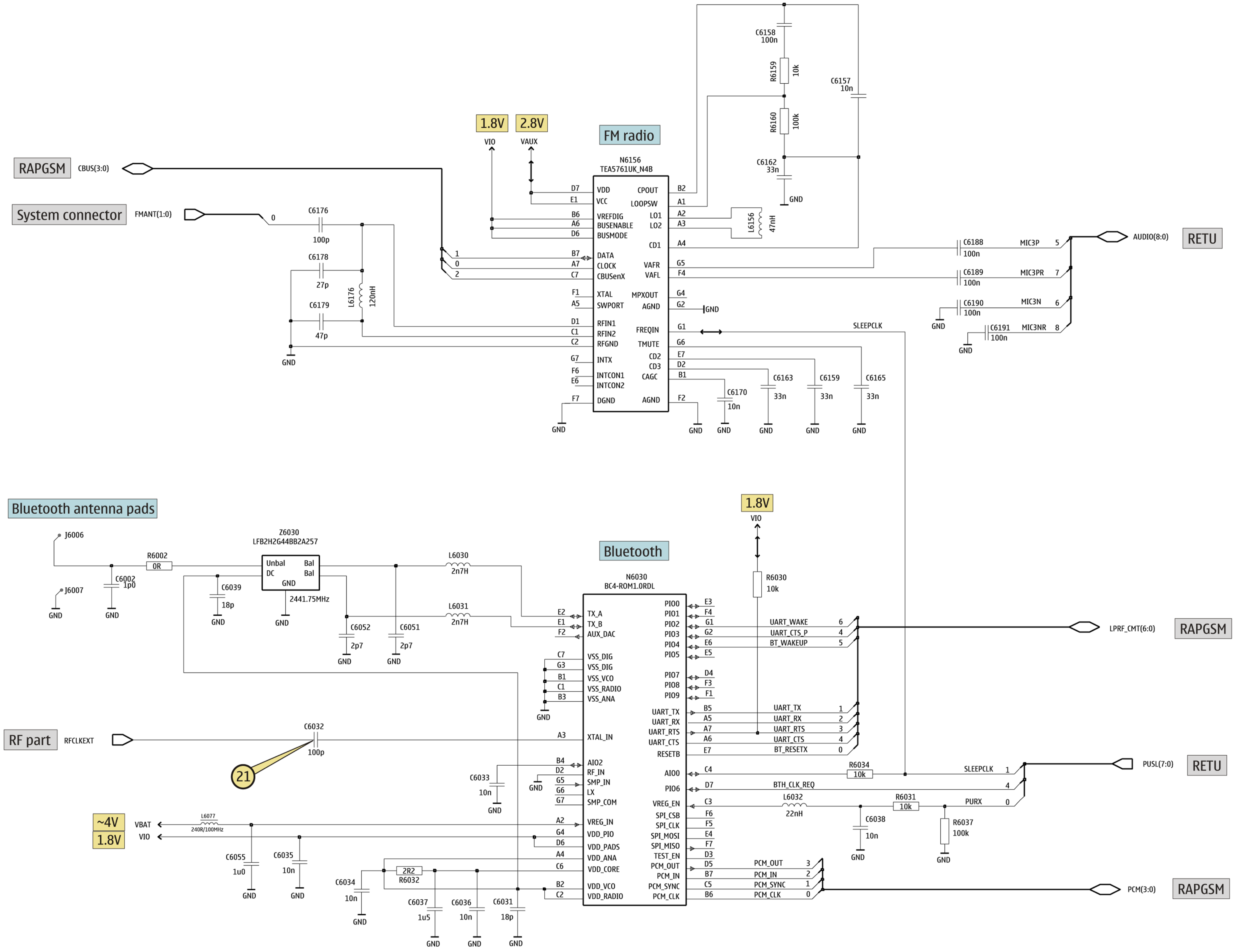
TAHVO


Flash interface
J2060
2 RXD2
1 RXD
3 CLK
0 TXD
GND
VPP
VBUS
TAHVO
N2300
TAHVO_V5.2_LF
System connector
CHARGER
D10
E10
E9
VCharIn1
VCharIn2
VCharInK
VPP_VIO
A1
Slave_PU
Master_PD1
Master_PD2
CLK
RXD2
D+_RXD
D-_TXD
J10
H9
J9
J6
K7
J7
K8
USB_ACI(7:0)
System connector
RETU
~4V
VBAT
L2301
220R/100MHz
C2309
22u
R2303
0R
C2300
10n
C2301
22u
GND
A7
A6
B5
A4
VBAT1
VBAT1
GND1
GND1
L2306
600R/100MHz
C2307
1u0
C2306
1u0
G9
VBAT3
VCCint
K9
C2303
1u0
A10
B10
A8
C10
B8
NC
OEX
FSEO
VO
RCV_FRX2
VP_FRX
VM_CLK
FTX
SLAVESWSET
J4
K4
J5
K2
J3
K3
K5
K6
J2309
J2314
J2310
J2311
J2312
J2313
J2315
INTUSB(8:0)
RAPGSM
F10
G10
F9
VCharOut1
VCharOut2
VCharOutK
Local mode = 1.4V
VCORE
C2302
22u
L2302
10uH
A5
B6
B4
VCoreCoil
VCoreCoil
VCore
RSTX
PURX
SLEEPX
Clk600
SleepClk
SMPSClk
B3
D2
D1
E1
E2
F1
J2308
PUSL(7:0)
RETU, RAPGSM
J8
F2
GND3
GND4
RETU
SLOWAD(6:0)
4
J2300
D9
J1
VChargADC
ChSwS
CHSWSTAT
VcoreDef
FlashM
TestMode
TestOut
C9
A2
B7
B9
11
2.5V if accessory connected
5V if USB connected
1.8V
A9
GND5
TahvoInt
C2
EMINT(1:0)
VOUT
VBUS
VIO
H10
K10
A3
Vout
VCC
VIO
CbusData
CbusSelX
CbusClk
GenOut1
GenOut2
GenOut3
C1
B1
B2
J2
K1
H1
CBUS(3:0)
GEN_OUT(3:0)
UI
C2312
1u0
C2313
1u0
C2304
10n
H2
G2
SENSE-
SENSE+
LED driver
H3
H4
H5
H6
H7
H8
G3
G8
F3
F8
PWM300
G1
J2316
E3
E8
D3
D8
C3
C4
C5
C6
C7
C8
L2304
22uH
L2305
240R/100MHz
VBAT
~4V
N2301
TPS61061YZFR
PWMTAHVO
A2
C2
C3
A3
EN
IND
PGND
NC
VOUT
VDD
AGND
FB
C1
B1
A1
B3
VLEDOUT1
C2315
4u7
C2314
4u7
SETCURR1
UI
Power supply for keyboard light
14V if lights on
J2306
J2307
CURRENT_SEN
R2300
C2076
10n
BGND

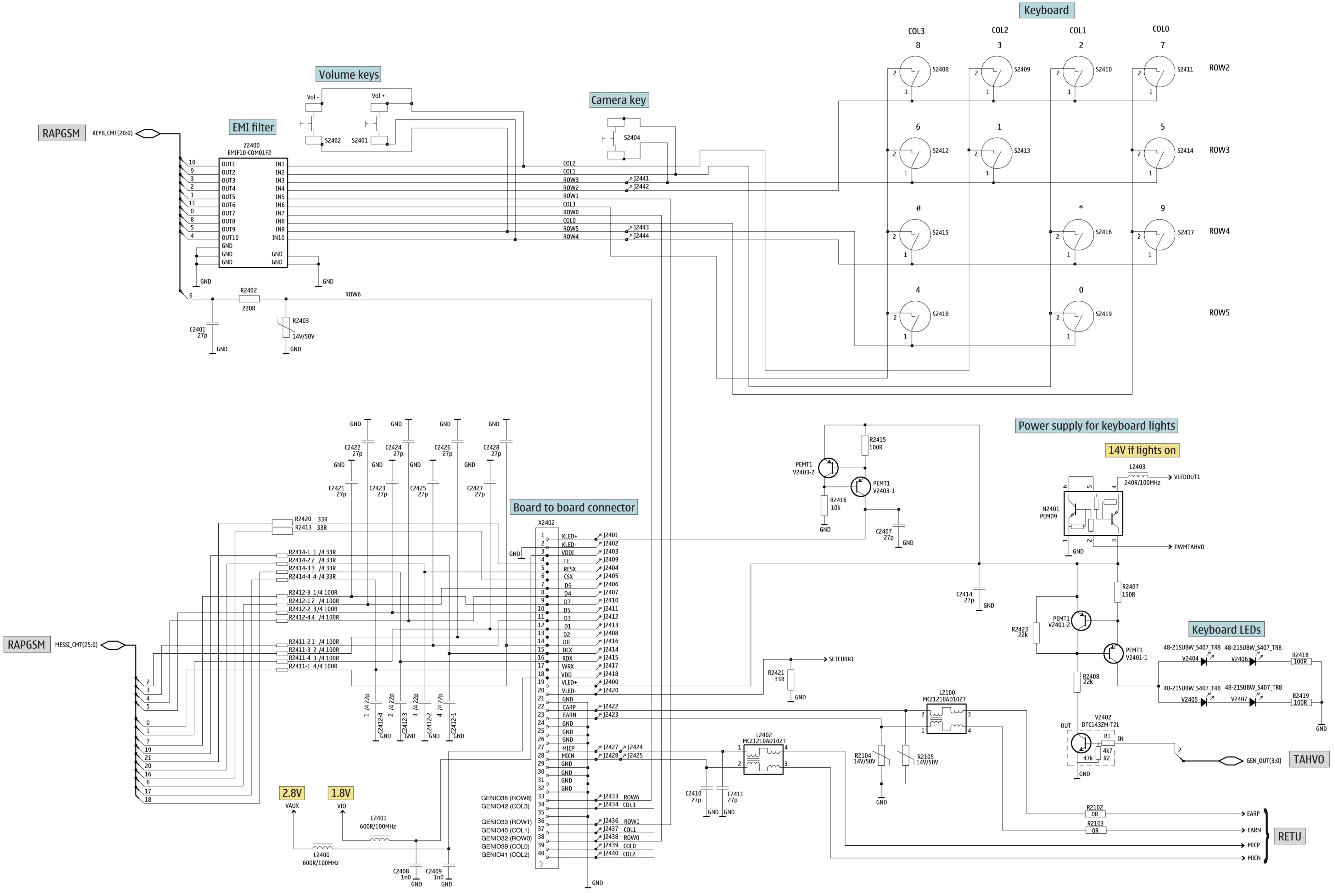
RAPGSM, Combo memory


RAPGSM
D2800
RAPGSM_V1.1PA
RF part
RETU, TAHVO
RETU
Bluetooth
TAHVO
RETU, TAHVO, FM radio
UI
Local mode = 1.4V
1.8V
1.8V
12
13
14
15
16
17
18
19
20
2.8V when microSD card is inserted
microSD connector
1.8V
~4V
1.8V
UI
1.8V
2.8V
Hall sensor
N2400
To check:
Use external magnet on hall sensor N2400!
Slide open: 0V
Slide closed: 1.8V
IrDA
N2600
~4V
2.8V
1.8V
Bluetooth
1.8V
UI
Combo memory
D3000
1.8V
1.8V
1.8V
1.8V
1.8V

FM radio, Bluetooth

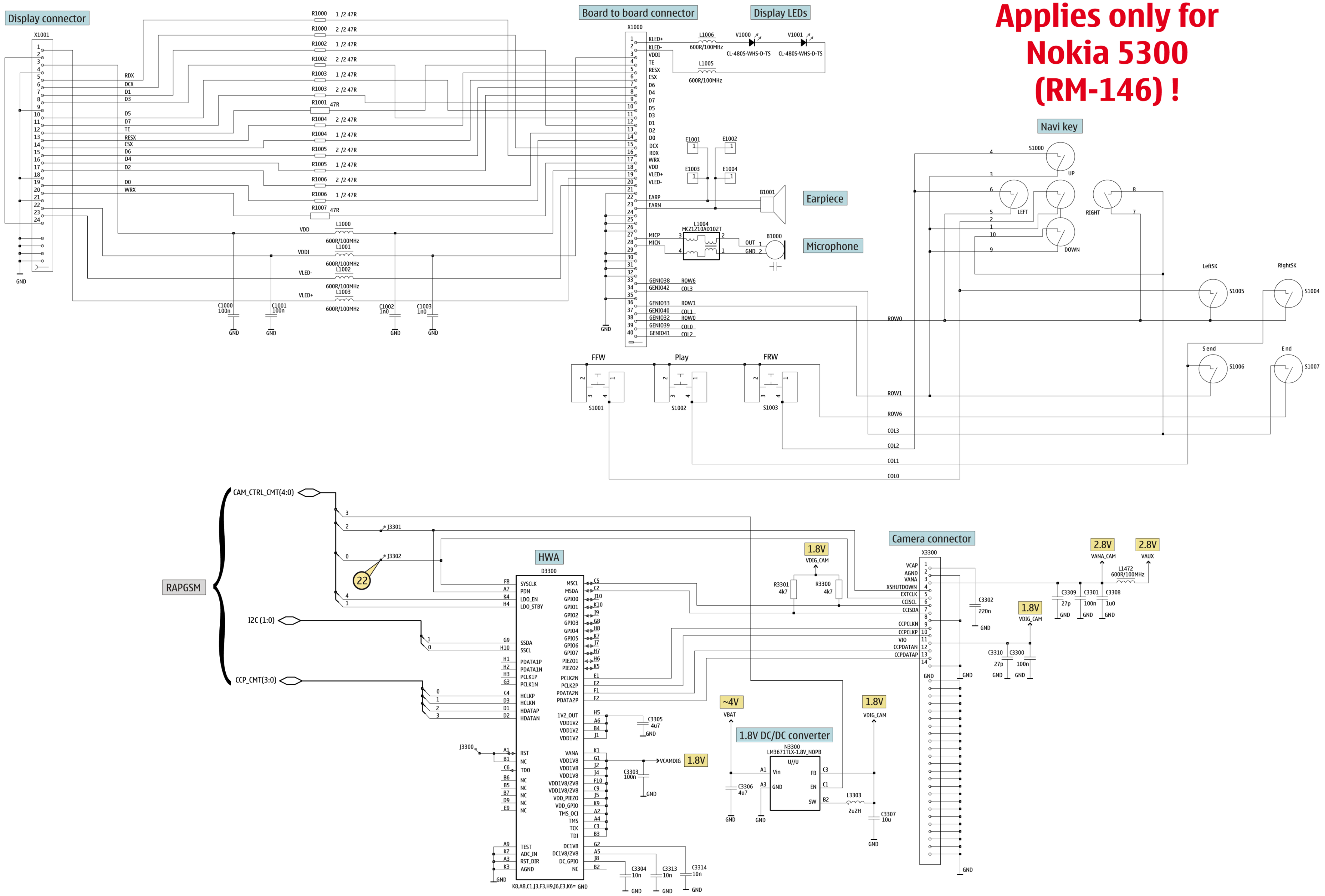

1.8V
2.8V
VIO
VAUX
FM radio
N6156
TEA5761UK_N4B
RAPGSM
CBUS(3:0)
System connector
FMANT(1:0)
C6176
100p
C6178
27p
C6179
47p
L6176
120nH
GND
VDD
VCC
VREFDIG
BUSENABLE
BUSMODE
DATA
CLOCK
CBUSenX
XTAL
SWPORT
RFIN1
RFIN2
RFGND
INTX
INTCON1
INTCON2
DGND
CPOUT
LOOPSW
LO1
LO2
CD1
VAFR
VAFL
MPXOUT
AGND
FREQIN
TMUTE
CD2
CD3
CAGC
C6158
100n
R6159
10k
R6160
100k
C6162
33n
C6157
10n
L6156
47nH
C6170
10n
C6163
33n
C6159
33n
C6165
33n
SLEEPCLK
C6188
100n
C6189
100n
C6190
100n
C6191
100n
MIC3P
MIC3PR
MIC3N
MIC3NR
AUDIO(8:0)
RETU
Bluetooth antenna pads
J6006
J6007
R6002
0R
C6002
1p0
Z6030
LFB2H2G44BB2A257
Unbal
DC
Bal
GND
2441.75MHz
C6039
18p
L6030
2n7H
L6031
2n7H
C6052
2p7
C6051
2p7
Bluetooth
N6030
BC4-ROM1.0RDL
1.8V
VIO
R6030
10k
TX_A
TX_B
AUX_DAC
VSS_DIG
VSS_VCO
VSS_RADIO
VSS_ANA
XTAL_IN
AIO2
RF_IN
SMP_IN
LX
SMP_COM
VREG_IN
VDD_PIO
VDD_PADS
VDD_ANA
VDD_CORE
VDD_VCO
VDD_RADIO
PIO0
PIO1
PIO2
PIO3
PIO4
PIO5
PIO7
PIO8
PIO9
UART_TX
UART_RX
UART_RTS
UART_CTS
RESETB
AIO0
PIO6
VREG_EN
SPI_CSB
SPI_CLK
SPI_MOSI
SPI_MISO
TEST_EN
PCM_OUT
PCM_IN
PCM_SYNC
PCM_CLK
UART_WAKE
UART_CTS_P
BT_WAKEUP
LPRF_CMT(6:0)
RAPGSM
BT_RESETX
R6034
10k
BTH_CLK_REQ
L6032
22nH
R6031
10k
PURX
C6038
10n
R6037
100k
PUSL(7:0)
RETU
PCM(3:0)
RAPGSM
RF part
RFCLKEXT
C6032
100p
21
C6033
10n
~4V
1.8V
VBAT
VIO
L6077
240R/100MHz
C6055
1u0
C6035
10n
C6034
10n
2R2
R6032
C6037
1u5
C6036
10n
C6031
18p

User interface (UI)


Keyboard
COL3
COL2
COL1
COL0
ROW2
ROW3
ROW4
ROW5
S2408
S2409
S2410
S2411
S2412
S2413
S2414
S2415
S2416
S2417
S2418
S2419
Volume keys
Vol -
Vol +
S2402
S2401
Camera key
S2404
RAPGSM
KEYB_CMT(20:0)
EMI filter
Z2400
EMIF10-COM01F2
OUT1
OUT2
OUT3
OUT4
OUT5
OUT6
OUT7
OUT8
OUT9
OUT10
IN1
IN2
IN3
IN4
IN5
IN6
IN7
IN8
IN9
IN10
GND
COL2
COL1
ROW3
ROW2
ROW1
COL3
ROW0
COL0
ROW5
ROW4
J2441
J2442
J2443
J2444
R2402
220R
ROW6
C2401
27p
R2403
14V/50V
C2421
C2422
C2423
C2424
C2425
C2426
C2427
C2428
27p
R2420 33R
R2413 33R
R2414-1
R2414-2
R2414-3
R2414-4
R2412-1
R2412-2
R2412-3
R2412-4
R2411-1
R2411-2
R2411-3
R2411-4
/4 33R
/4 100R
C2412-1
C2412-2
C2412-3
C2412-4
/4 22p
RAPGSM
MESSI_CMT(25:0)
Board to board connector
X2402
KLED+
KLED-
VDDI
TE
RESX
CSX
D6
D4
D7
D5
D3
D1
D2
D0
DCX
RDX
WRX
VDD
VLED+
VLED-
EARP
EARN
MICP
MICN
J2400
J2401
J2402
J2403
J2404
J2405
J2406
J2407
J2408
J2409
J2410
J2411
J2412
J2413
J2414
J2415
J2416
J2417
J2418
J2420
J2422
J2423
J2424
J2425
J2427
J2428
J2433
J2434
J2436
J2437
J2438
J2439
J2440
GENIO38 (ROW6)
GENIO42 (COL3)
GENIO33 (ROW1)
GENIO40 (COL1)
GENIO32 (ROW0)
GENIO39 (COL0)
GENIO41 (COL2)
2.8V
VAUX
1.8V
VIO
L2401
600R/100MHz
L2400
600R/100MHz
C2408
1n0
C2409
1n0
Power supply for keyboard lights
14V if lights on
R2415
100R
PEMT1
V2403-2
V2403-1
R2416
10k
C2407
27p
L2403
240R/100MHz
VLEDOUT1
N2401
PEMD9
PWMTAHVO
C2414
27p
R2407
150R
R2423
22k
V2401-2
V2401-1
R2408
22k
Keyboard LEDs
48-21SUBW_S407_TR8
V2404
V2405
V2406
V2407
R2418
100R
R2419
100R
SETCURR1
R2421
33R
L2100
MCZ1210AD102T
L2402
MCZ1210AD102T
R2104
14V/50V
R2105
14V/50V
C2410
27p
C2411
27p
V2402
DTC143ZM-T2L
OUT
IN
R1
R2
47k
4k7
GEN_OUT(3:0)
TAHVO
R2102
0R
R2103
0R
EARP
EARN
MICP
MICN
RETU
GND

COMPANY CONFIDENTIAL

Camera, Earpiece, LCD interface (RM-146/147, Nokia 5300)

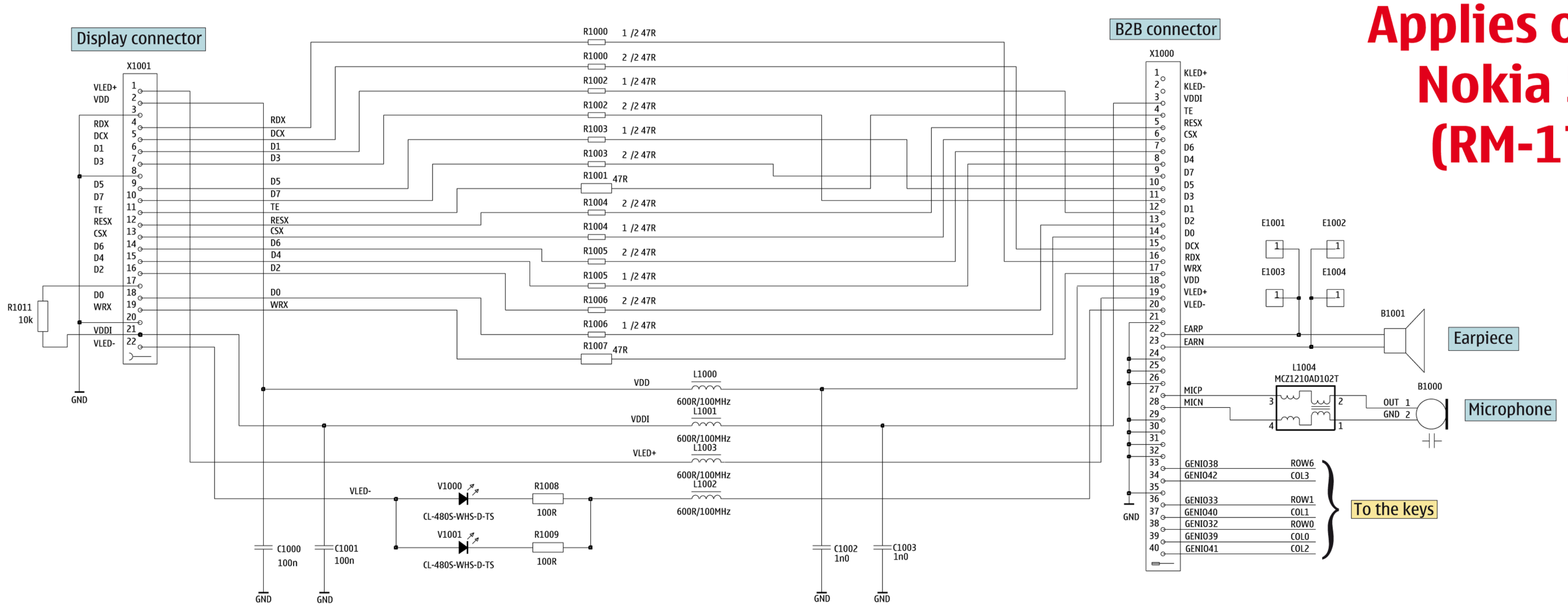


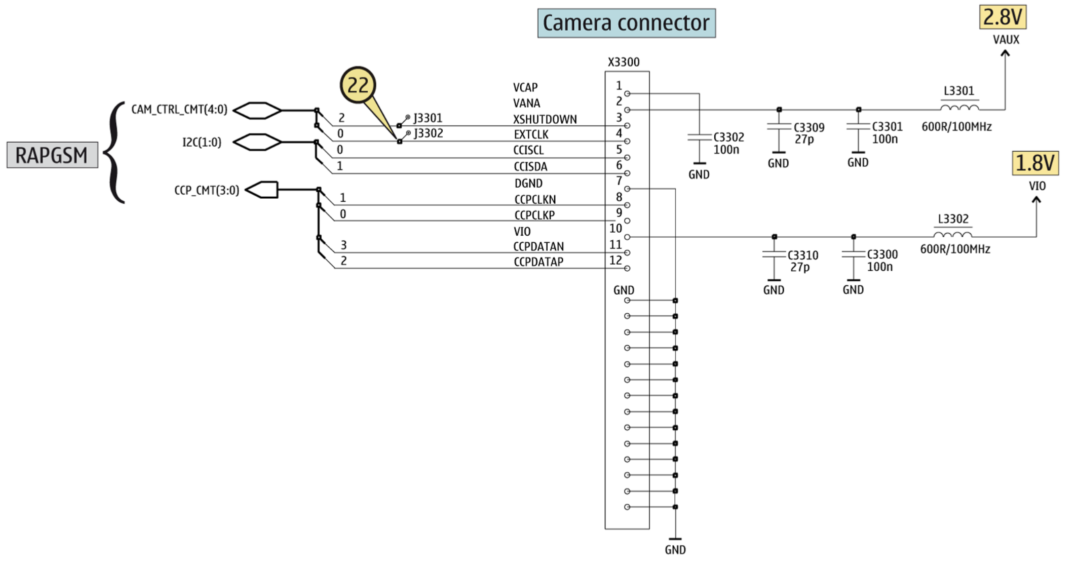
Applies only for Nokia 5300 (RM-146) !

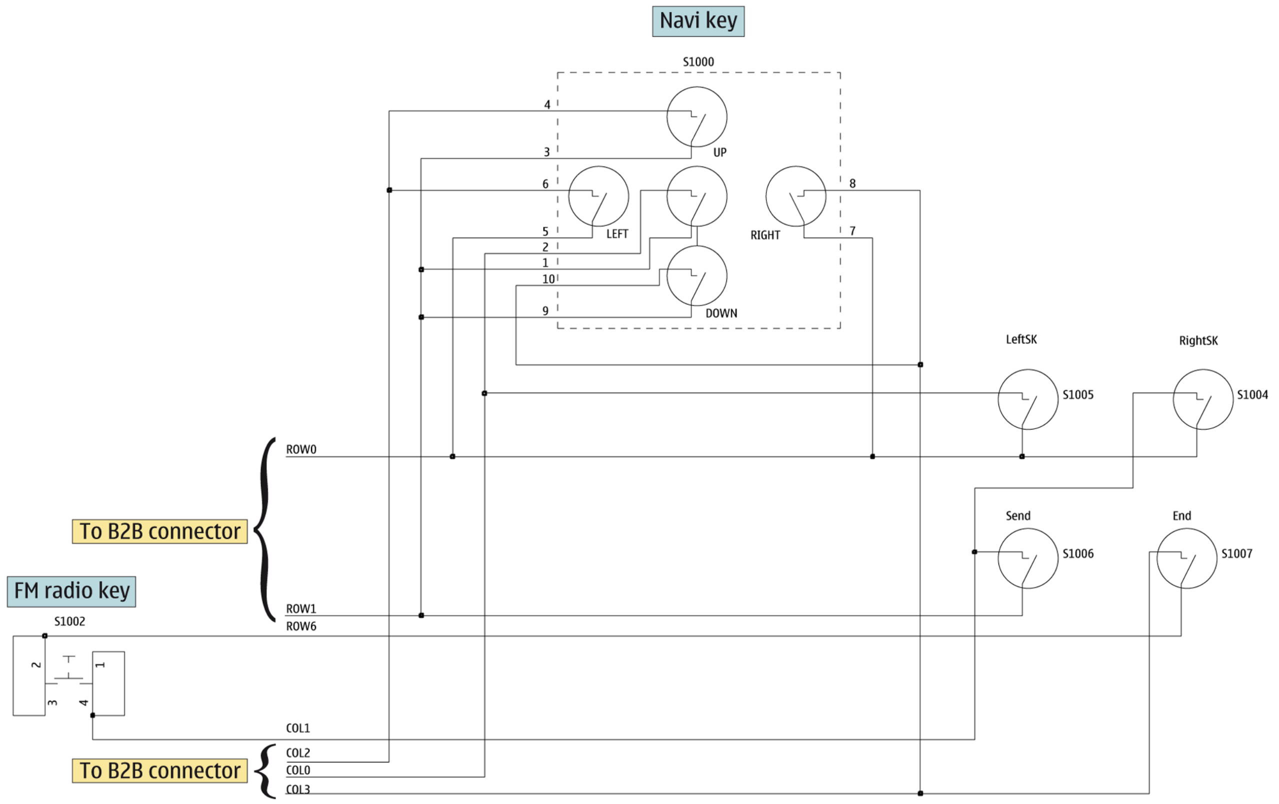
Display connector
X1001
RDX
DCX
D1
D3
D5
D7
TE
RESX
CSX
D6
D4
D2
D0
WRX
GND
R1000 1 /2 47R
R1000 2 /2 47R
R1002 1 /2 47R
R1002 2 /2 47R
R1003 1 /2 47R
R1003 2 /2 47R
R1001 47R
R1004 2 /2 47R
R1004 1 /2 47R
R1005 2 /2 47R
R1005 1 /2 47R
R1006 2 /2 47R
R1006 1 /2 47R
R1007 47R
VDD
VDDI
VLED-
VLED+
L1000 600R/100MHz
L1001 600R/100MHz
L1002 600R/100MHz
L1003 600R/100MHz
C1000 100n
C1001 100n
C1002 1n0
C1003 1n0
Board to board connector
X1000
KLED+
KLED-
VDDI
TE
RESX
CSX
D6
D4
D7
D5
D3
D1
D2
D0
DCX
RDX
WRX
VDD
VLED+
VLED-
EARP
EARN
MICP
MICN
GENIO38 ROW6
GENIO42 COL3
GENIO33 ROW1
GENIO40 COL1
GENIO32 ROW0
GENIO39 COL0
GENIO41 COL2
Display LEDs
L1006 600R/100MHz
L1005 600R/100MHz
V1000 CL-480S-WHS-D-TS
V1001 CL-480S-WHS-D-TS
E1001
E1002
E1003
E1004
B1001
Earpiece
L1004 MCZ1210AD102T
B1000
OUT
GND
Microphone
Navi key
S1000
UP
LEFT
RIGHT
DOWN
LeftSK
RightSK
S1005
S1004
Send
End
S1006
S1007
FFW
Play
FRW
S1001
S1002
S1003
ROW0
ROW1
ROW6
COL3
COL2
COL1
COL0
RAPGSM
CAM_CTRL_CMT(4:0)
I2C (1:0)
CCP_CMT(3:0)
J3301
J3302
22
HWA
D3300
SYSCLK
PDN
LDO_EN
LDO_STBY
SSDA
SSCL
PDATA1P
PDATA1N
PCLK1P
PCLK1N
HCLKP
HCLKN
HDATAP
HDATAN
RST
TDO
TEST
ADC_IN
RST_DIR
AGND
MSCL
MSDA
GPIO0
GPIO1
GPIO2
GPIO3
GPIO4
GPIO5
GPIO6
GPIO7
PIEZO1
PIEZO2
PCLK2N
PCLK2P
PDATA2N
PDATA2P
1V2_OUT
VDD1V2
VANA
VDD1V8
VDD1V8/2V8
VDD_PIEZO
VDD_GPIO
TMS_OCI
TMS
TCK
TDI
DC1V8
DC1V8/2V8
DC_GPIO
NC
J3300
C3305 4u7
C3303 100n
VCAMDIG
1.8V
C3304 10n
C3313 10n
C3314 10n
K8,A8,C1,J3,F3,H9,J6,E3,K6= GND
VDIG_CAM
R3301 4k7
R3300 4k7
~4V
VBAT
1.8V DC/DC converter
N3300
LM3671TLX-1.8V_NOPB
U/U
Vin
GND
FB
EN
SW
C3306 4u7
L3303 2u2H
C3307 10u
Camera connector
X3300
VCAP
AGND
VANA
XSHUTDOWN
EXTCLK
CCISCL
CCISDA
CCPCLKN
CCPCLKP
VIO
CCPDATAN
CCPDATAP
C3302 220n
2.8V
VANA_CAM
VAUX
L1472 600R/100MHz
C3309 27p
C3301 100n
C3308 1u0
C3310 27p
C3300 100n
GND

Camera, Earpiece, LCD interface (RM-174/181, Nokia 5200)

Applies only for Nokia 5200 (RM-174) !

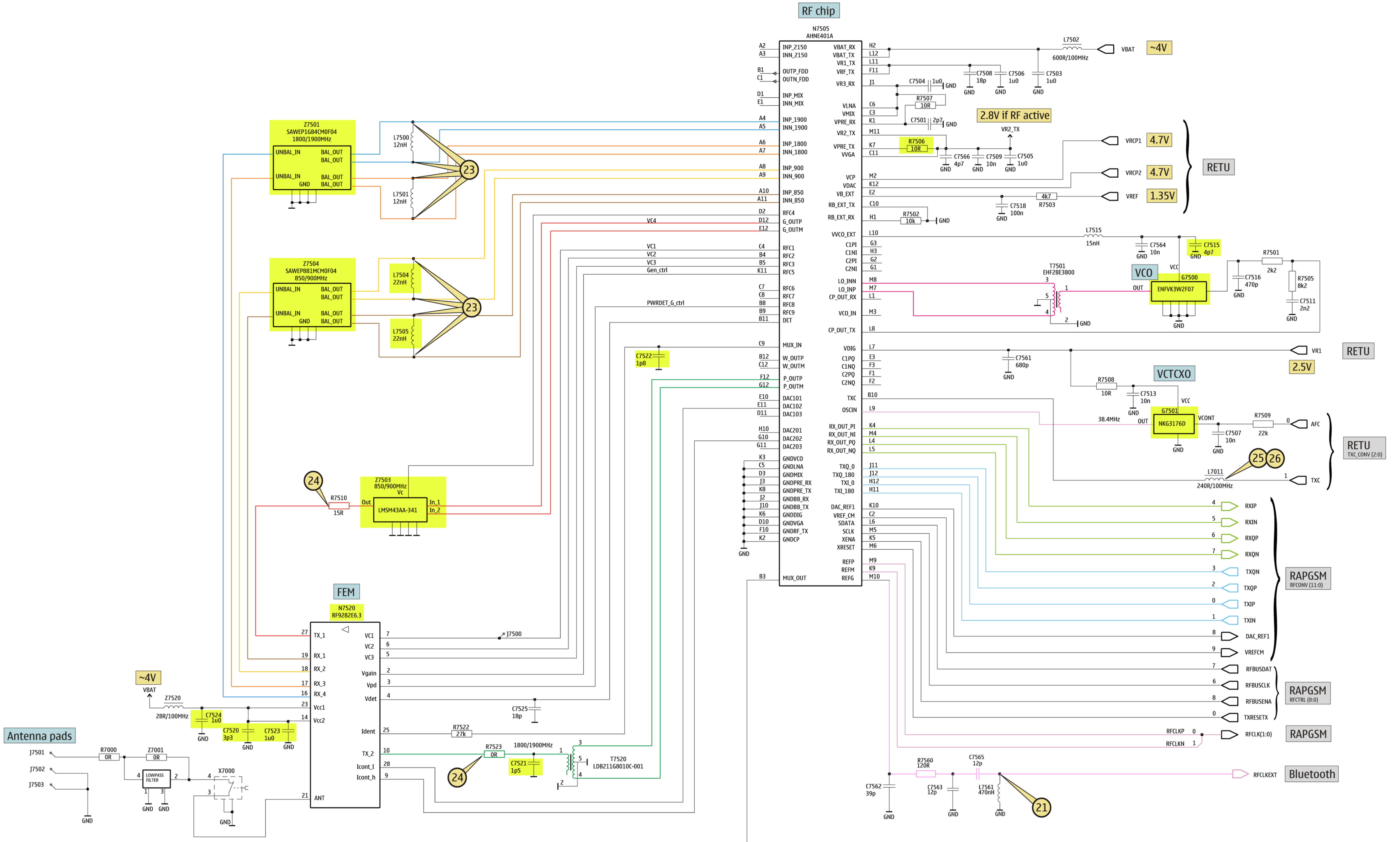

Display connector
X1001
VLED+
VDD
RDX
DCX
D1
D3
D5
D7
TE
RESX
CSX
D6
D4
D2
D0
WRX
VDDI
VLED-
R1011
10k
GND
R1000 1 /2 47R
R1000 2 /2 47R
R1002 1 /2 47R
R1002 2 /2 47R
R1003 1 /2 47R
R1003 2 /2 47R
R1001 47R
R1004 2 /2 47R
R1004 1 /2 47R
R1005 2 /2 47R
R1005 1 /2 47R
R1006 2 /2 47R
R1006 1 /2 47R
R1007 47R
VDD
L1000
600R/100MHz
VDDI
L1001
600R/100MHz
VLED+
L1003
600R/100MHz
VLED-
L1002
600R/100MHz
V1000
CL-480S-WHS-D-TS
R1008
100R
V1001
CL-480S-WHS-D-TS
R1009
100R
C1000
100n
C1001
100n
C1002
1n0
C1003
1n0
GND
B2B connector
X1000
KLED+
KLED-
VDDI
TE
RESX
CSX
D6
D4
D7
D5
D3
D1
D2
D0
DCX
RDX
WRX
VDD
VLED+
VLED-
EARP
EARN
MICP
MICN
GENIO38
GENIO42
GENIO33
GENIO40
GENIO32
GENIO39
GENIO41
ROW6
COL3
ROW1
COL1
ROW0
COL0
COL2
To the keys
E1001
E1002
E1003
E1004
B1001
Earpiece
L1004
MCZ1210AD102T
B1000
OUT 1
GND 2
Microphone


Camera connector
RAPGSM
CAM_CTRL_CMT(4:0)
I2C(1:0)
CCP_CMT(3:0)
22
J3301
J3302
X3300
VCAP
VANA
XSHUTDOWN
EXTCLK
CCISCL
CCISDA
DGND
CCPCLKN
CCPCLKP
VIO
CCPDATAN
CCPDATAP
GND
C3302
100n
C3309
27p
C3301
100n
L3301
600R/100MHz
2.8V
VAUX
1.8V
VIO
L3302
600R/100MHz
C3310
27p
C3300
100n


Navi key
S1000
UP
LEFT
RIGHT
DOWN
LeftSK
S1005
RightSK
S1004
Send
S1006
End
S1007
To B2B connector
ROW0
ROW1
ROW6
FM radio key
S1002
COL1
COL2
COL0
COL3
To B2B connector

COMPANY CONFIDENTIAL

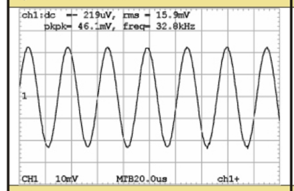
RF part


RF chip
N7505
AHNE401A
Z7501
SAWEP1G84CM0F04
1800/1900MHz
Z7504
SAWEP881MCM0F04
850/900MHz
L7500
12nH
L7501
12nH
L7504
22nH
L7505
22nH
23
24
Z7503
850/900MHz
LMSM43AA-341
R7510
15R
FEM
N7520
RF9282E6.3
~4V
VBAT
Z7520
28R/100MHz
C7524
1u0
C7520
3p3
C7523
1u0
Antenna pads
J7501
J7502
J7503
R7000
0R
Z7001
0R
LOWPASS FILTER
X7000
C7525
18p
R7522
27k
R7523
0R
1800/1900MHz
C7521
1p5
T7520
LDB211G8010C-001
C7522
1p8
VC4
VC1
VC2
VC3
Gen_ctrl
PWRDET_G_ctrl
L7502
600R/100MHz
VBAT
~4V
2.8V if RF active
R7506
10R
R7507
10R
VRCP1
4.7V
VRCP2
4.7V
VREF
1.35V
RETU
R7503
4k7
R7502
10k
L7515
15nH
C7515
4p7
T7501
EHF2BE3800
VCO
G7500
ENFVK3W2F07
R7501
2k2
R7505
8k2
C7511
2n2
C7516
470p
VR1
RETU
2.5V
C7561
680p
VCTCXO
R7508
10R
C7513
10n
G7501
NKG3176D
38.4MHz
R7509
22k
AFC
C7507
10n
RETU
TXC_CONV (2:0)
L7011
240R/100MHz
TXC
25
26
RXIP
RXIN
RXQP
RXQN
TXQN
TXQP
TXIP
TXIN
DAC_REF1
VREFCM
RAPGSM
RFCONV (11:0)
RFBUSDAT
RFBUSCLK
RFBUSENA
TXRESETX
RAPGSM
RFCTRL (8:0)
RFCLKP
RFCLKN
RFCLK(1:0)
RAPGSM
R7560
120R
C7565
12p
C7562
39p
C7563
12p
L7561
470nH
21
RFCLKEXT
Bluetooth
L7010
240R/100MHz
RFTEMP
RETU
SLOWAD (6:0)

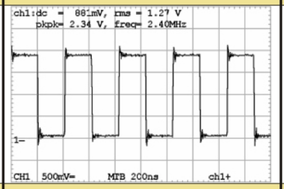
	C7515	C7520	C7521	C7523	C7524	G7500 (VCO)	G7501 (VCTXO)	L7504	L7505	N7520	R7506	Z7501	Z7503	Z7504
BOM1	4p7	3p3	1p5	na	na	Matsushita	NDK	22nH	22nH	RFMD 9282 E6.3	10R	Murata	Murata	Murata
BOM2	4p7	3p3	1p5	na	na	Matsushita	NDK	27nH	33nH	RFMD 9282 E6.3	10R	FMD	Epcos	Epcos

Signal overview

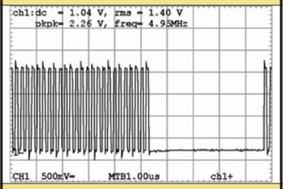
1) 32 kHz at C2208



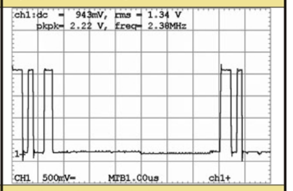
2) AudioClk at J2200



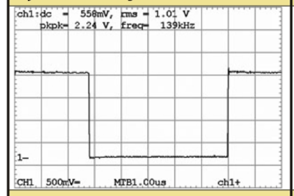
3) SerClk at J2206



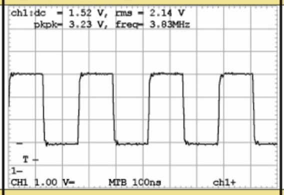
4) SerData at J2207



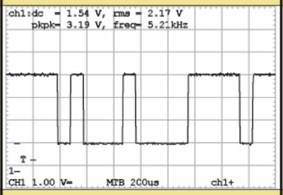
5) SerSelX at J2209



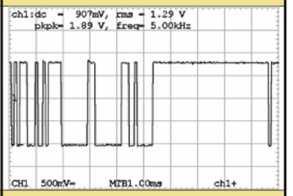
6) SIMClk1 at J2213



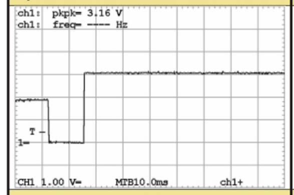
7) SIMDa1 at J2214



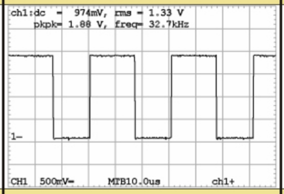
8) SIMIOC1 at J2215



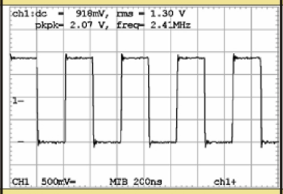
9) VSIM1 at C2212



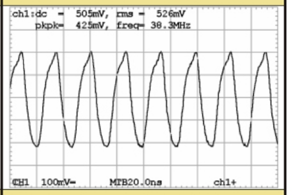
10) SlClk at J2217



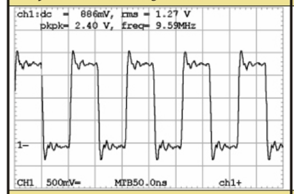
11) SMPSClk at J2308



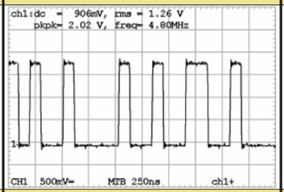
12) RFCLK at J2851 & J2852



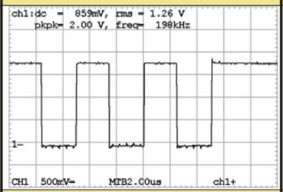
13) RFBusClk at J2833



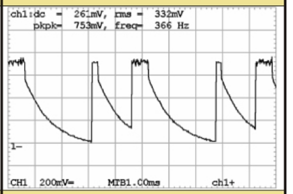
14) RFBusDa at J2834



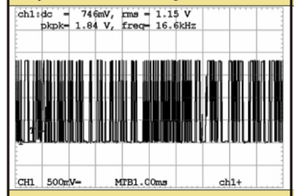
15) RFBusEn1X at J2835



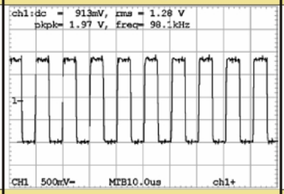
16) RX I/Q at J2828-2831



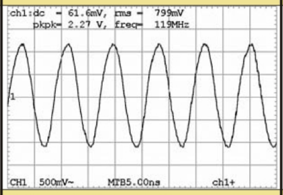
17) CameraSDA at J2803



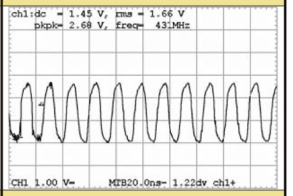
18) CameraSCL at J2804



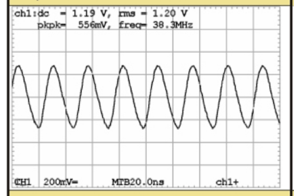
19) SDRAMClk at J3001



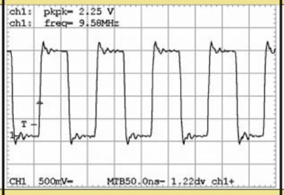
20) FlashClk at J3004



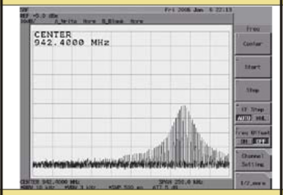
21) RFCLKEXT at C6032



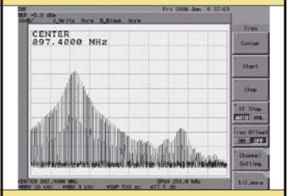
22) CameraCLK at J3302



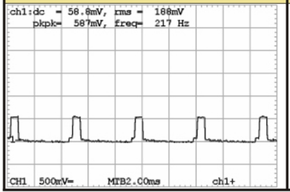
23) RX at L7500, L7501, L7504,L7505



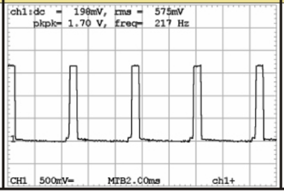
24) TX at R7510 & R7523

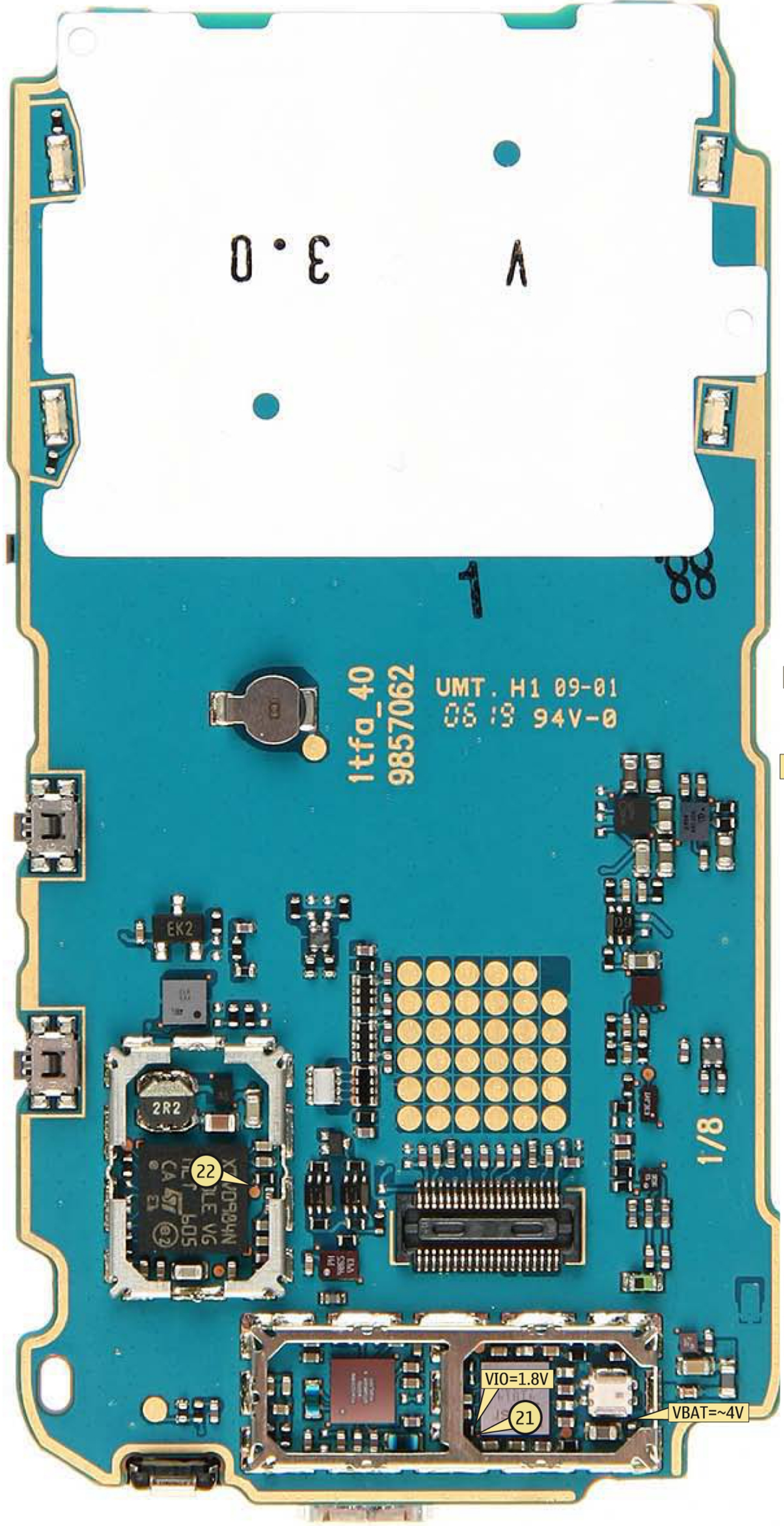


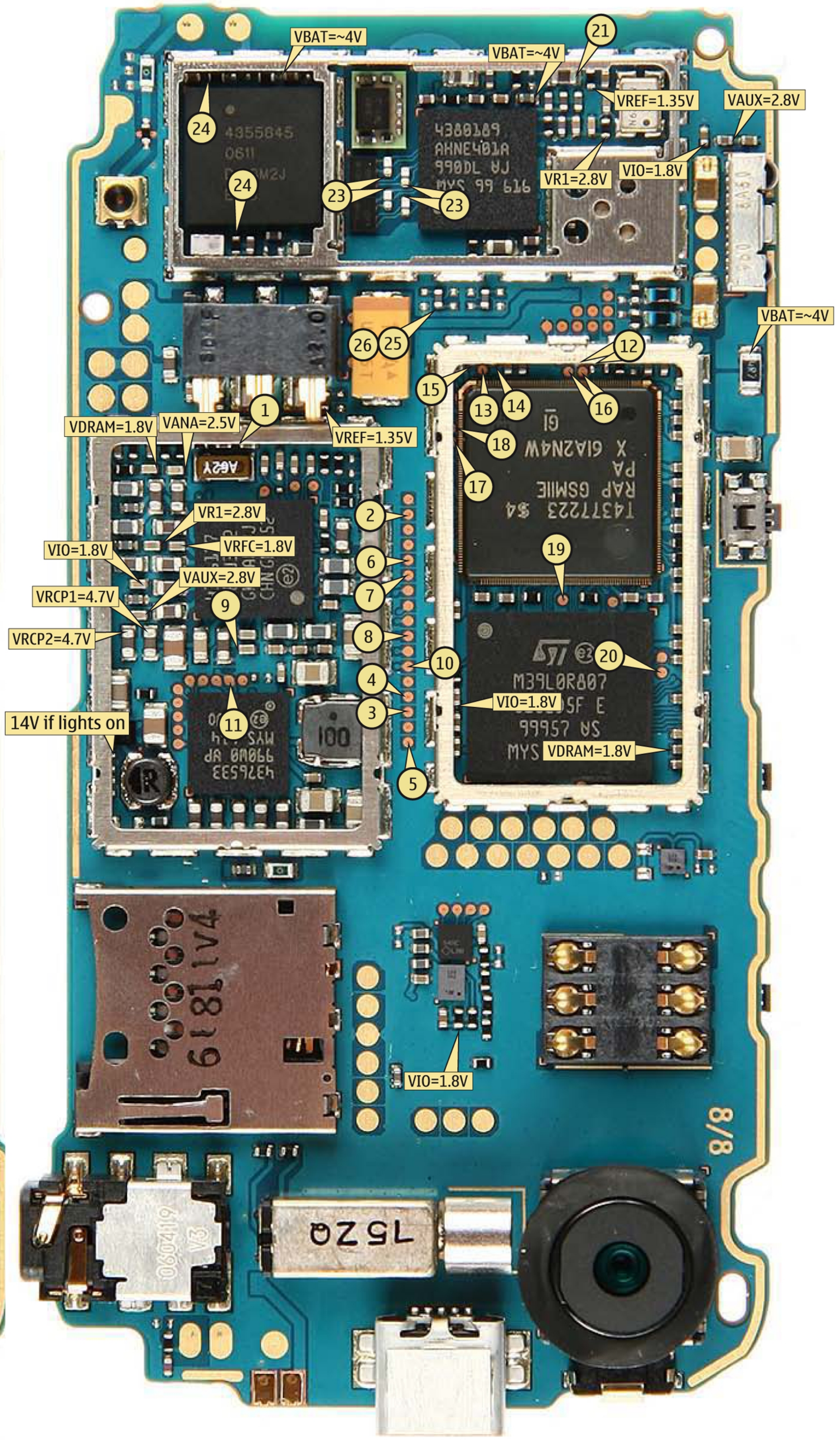
25) TXC GSM900 PL19 at L7011



26) TXC GSM900 PL5 at I7011






VBAT=~4V
VBAT=~4V
21
VREF=1.35V
VAUX=2.8V
24
24
23
23
VR1=2.8V
VIO=1.8V
VBAT=~4V
26
25
12
15
13
14
16
1
VDRAM=1.8V
VANA=2.5V
VREF=1.35V
18
17
VR1=2.8V
2
VRFC=1.8V
VIO=1.8V
6
VAUX=2.8V
VRCP1=4.7V
7
9
19
VRCP2=4.7V
8
10
20
4
VIO=1.8V
3
14V if lights on
11
VDRAM=1.8V
5
VIO=1.8V

Component finder (RM-146/147, Nokia 5300)

B		C2302	J5	C3201	G6	C7525	Q3	J2316	J3	J3300	E9	N2600	P10	R3003	K7
B2200	M4	C2303	I3	C3202	G7	C7560	P9	J2400	F6	J3301	D8	N3200	G6	R3004	K8
C		C2304	J4	C3203	G6	C7561	Q8	J2401	F4	J3302	E7	N3300	F8	R3200	G6
C2000	C2	C2305	H2	C3210	G3	C7562	Q6	J2402	G4	J6006	B3	N6030	C5	R3201	G7
C2008	D7	C2306	I4	C3242	F6	C7563	Q7	J2403	G4	J6007	B3	N6156	C6	R3202	G7
C2017	C3	C2307	I4	C3300	D9	C7564	O8	J2404	F5	J7500	O2	N7505	P7	R3203	F7
C2030	F3	C2309	I5	C3301	D7	C7565	Q7	J2405	F4	J7502	R4	N7520	P4	R3204	F7
C2031	I2	C2312	I4	C3302	D7	C7566	Q8	J2406	G5	J7503	Q2	**R**		R3242	F6
C2032	E3	C2313	I3	C3303	E7	**D**		J2407	F5	T6000	C5	R2007	D6	R3243	F6
C2033	I2	C2314	J3	C3304	D8	D2200	L4	J2408	F5	T6001	C3	R2008	D6	R3300	D9
C2034	I3	C2315	J2	C3305	D8	D2800	M8	J2409	G5	T6002	C5	R2033	F3	R3301	E9
C2035	F3	C2401	H7	C3306	F7	D3000	J8	J2410	G5	T6003	C5	R2034	F3	R3306	E9
C2040	I2	C2402	H8	C3307	F8	D3300	E8	J2411	G5	T6004	C4	R2035	E3	R3307	E9
C2041	I3	C2403	C8	C3308	E7	**E**		J2412	G5	T6005	B4	R2036	E3	R3312	G8
C2042	H3	C2404	E6	C3309	D7	E2001	B4	J2413	F5	**L**		R2037	I3	R3313	G7
C2043	H3	C2405	E6	C3310	D9	E2002	B4	J2414	F5	L2000	C2	R2044	I2	R3314	E7
C2044	D3	C2406	E4	C3311	G8	E2101	O9	J2415	F5	L2030	E3	R2045	I2	R6002	B3
C2045	D3	C2407	E4	C3312	G7	E2102	P9	J2416	G5	L2031	E3	R2049	H3	R6030	B5
C2046	I4	C2408	E4	C3313	E7	**F**		J2417	F6	L2032	D3	R2050	H3	R6031	C4
C2047	I3	C2409	E5	C3314	D8	F2000	C3	J2418	F5	L2033	E3	R2051	E3	R6032	C5
C2048	I3	C2410	F2	C6001	B3	**G**		J2420	F6	L2100	H7	R2052	I4	R6034	B4
C2049	J3	C2411	F2	C6002	B3	G2200	J7	J2421	C8	L2102	N9	R2070	M3	R6037	C4
C2051	J3	C2412	F7	C6031	C3	G7500	O8	J2422	G6	L2103	O9	R2100	G3	R6156	C6
C2070	N5	C2413	I2	C6032	B5	G7501	Q8	J2423	G5	L2202	L2	R2101	H3	R6159	B7
C2071	N3	C2414	E6	C6033	B5	**J**		J2424	F5	L2203	L2	R2102	H6	R6160	B7
C2073	N3	C2415	H9	C6034	B4	J2000	B4	J2425	G5	L2204	L2	R2103	H7	R6161	C6
C2074	N3	C2416	F6	C6035	C5	J2001	E5	J2427	F4	L2205	L2	R2104	G7	R7000	Q3
C2100	G3	C2417	H6	C6036	C5	J2003	E5	J2428	F4	L2206	K2	R2105	G7	R7501	P8
C2101	G3	C2421	E4	C6037	C5	J2004	F5	J2433	F5	L2207	M5	R2106	N8	R7502	O6
C2102	H3	C2422	G6	C6038	C4	J2005	F5	J2434	G4	L2208	M5	R2107	O8	R7503	Q7
C2103	H7	C2423	E5	C6039	B4	J2007	E7	J2436	D5	L2209	M5	R2108	E4	R7505	P8
C2104	H7	C2424	G6	C6040	C5	J2008	E6	J2437	G4	L2210	M5	R2109	E4	R7506	Q7
C2105	G3	C2425	E5	C6051	B4	J2009	E6	J2438	G6	L2270	K5	R2113	G3	R7507	O7
C2111	O8	C2426	E5	C6052	C4	J2010	B4	J2439	F4	L2271	L5	R2114	G3	R7508	Q8
C2200	L5	C2427	F6	C6055	B4	J2011	F3	J2440	G6	L2272	K4	R2115	G3	R7509	Q8
C2201	L3	C2428	G6	C6157	C7	J2060	H7	J2441	F4	L2273	K5	R2200	M2	R7510	Q3
C2202	M2	C2600	M10	C6158	C7	J2070	O2	J2442	G4	L2301	H5	R2201	M3	R7522	Q4
C2203	M4	C2601	Q9	C6159	C6	J2071	N2	J2443	G5	L2302	J5	R2202	L5	R7523	O4
C2204	M4	C2602	Q10	C6162	C7	J2072	N2	J2444	G5	L2304	I3	R2203	L5	R7560	Q6
C2205	M5	C2603	Q9	C6163	B6	J2074	N2	J2803	M6	L2305	H3	R2204	L5	**S**	
C2206	M4	C2700	H9	C6164	C6	J2075	N2	J2804	M6	L2306	H4	R2205	L5	S2401	F10
C2207	M3	C2701	H9	C6165	C6	J2076	N2	J2828	N8	L2400	E5	R2212	L5	S2402	I10
C2208	M4	C2800	L9	C6167	B7	J2101	O9	J2829	N8	L2401	E4	R2213	M3	S2403	B8
C2209	M4	C2801	N9	C6170	B7	J2102	O9	J2830	N8	L2402	G2	R2214	M2	S2404	L10
C2210	K3	C2802	M9	C6176	B6	J2200	L6	J2831	N8	L2403	I2	R2216	M3	**T**	
C2211	K3	C2803	L9	C6178	B6	J2201	K6	J2833	N7	L2701	H9	R2250	M5	T7501	P8
C2212	K4	C2804	N9	C6179	B6	J2202	K6	J2834	N7	L3200	G6	R2251	M5	T7520	O3
C2213	L3	C2805	K6	C6188	C6	J2203	K6	J2835	N6	L3201	G6	R2303	H4	**V**	
C2214	L3	C2807	N9	C6189	C6	J2204	L5	J2851	N8	L3202	G7	R2401	H8	V2000	C3
C2215	K3	C2808	M9	C6190	C7	J2205	L4	J2852	N8	L3301	E7	R2402	H8	V2401	E6
C2216	K3	C2809	M9	C6191	C7	J2206	J6	J3000	I8	L3303	F8	R2403	G7	V2402	F6
C2217	M3	C2810	K9	C7000	Q2	J2207	J6	J3001	K8	L6030	C4	R2404	C8	V2403	E7
C2218	L4	C2811	K7	C7001	Q2	J2209	I6	J3002	L6	L6031	C4	R2406	C8	V2404	P2
C2219	M3	C2812	L9	C7010	O6	J2210	L4	J3003	I7	L6032	C4	R2407	E6	V2405	N2
C2220	K4	C2813	N6	C7011	O6	J2212	L6	J3004	J9	L6077	B3	R2408	E6	V2406	P10
C2221	K2	C2814	M9	C7012	O7	J2213	L6	J3005	J9	L6156	C7	R2411	G6	V2407	N10
C2222	K3	C2815	K9	C7013	O6	J2214	K6	J3006	K8	L6176	B6	R2412	G6	**X**	
C2223	K5	C2816	K9	C7501	O7	J2215	K6	J3100	N8	L7010	O7	R2413	F6	X2000	B4
C2224	L5	C2818	K7	C7502	Q7	J2216	J6	J3101	O8	L7011	O6	R2414	F6	X2002	B6
C2225	L3	C2819	K8	C7503	Q8	J2217	J6	J3102	N8	L7500	P6	R2415	E7	X2030	D3
C2226	K3	C2820	N7	C7504	O7	J2218	J6	J3103	O8	L7501	P5	R2416	E7	X2070	N4
C2227	K4	C2821	N7	C7505	Q8	J2219	J6	J3104	N8	L7502	Q7	R2417	E6	X2402	E5
C2228	L3	C2830	N8	C7506	Q8	J2220	L6	J3105	O8	L7503	Q4	R2418	Q10	X2700	F8
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C2230	L3	C3000	I6	C7508	Q7	J2222	J7	J3107	O8	L7505	P5	R2420	G6	X3300	C8
C2231	K5	C3001	J6	C7509	Q8	J2300	J4	J3112	H6	L7515	P8	R2421	J3	X7000	P2
C2232	K3	C3002	J6	C7511	P8	J2306	N5	J3113	H7	L7561	Q6	R2422	H3	**Z**	
C2270	K5	C3003	K9	C7513	Q8	J2307	N5	J3114	H7	**M**		R2423	E6	Z2001	D7
C2271	K5	C3004	K9	C7515	O8	J2308	J4	J3115	H7	M2100	D5	R2600	N10	Z2400	G8
C2272	L5	C3005	J9	C7516	P8	J2309	J3	J3116	H8	**N**		R2700	H9	Z6030	C3
C2273	K4	C3006	I9	C7518	Q7	J2310	J3	J3117	H8	N2030	F3	R2803	L9	Z7001	Q3
C2274	K4	C3007	J9	C7520	O4	J2311	J3	J3118	N7	N2031	I3	R2804	L9	Z7501	P5
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C2300	I5	C3100	H7	C7523	O4	J2314	J3	J3202	G6	N2400	H8	R3000	J6	Z7520	O5
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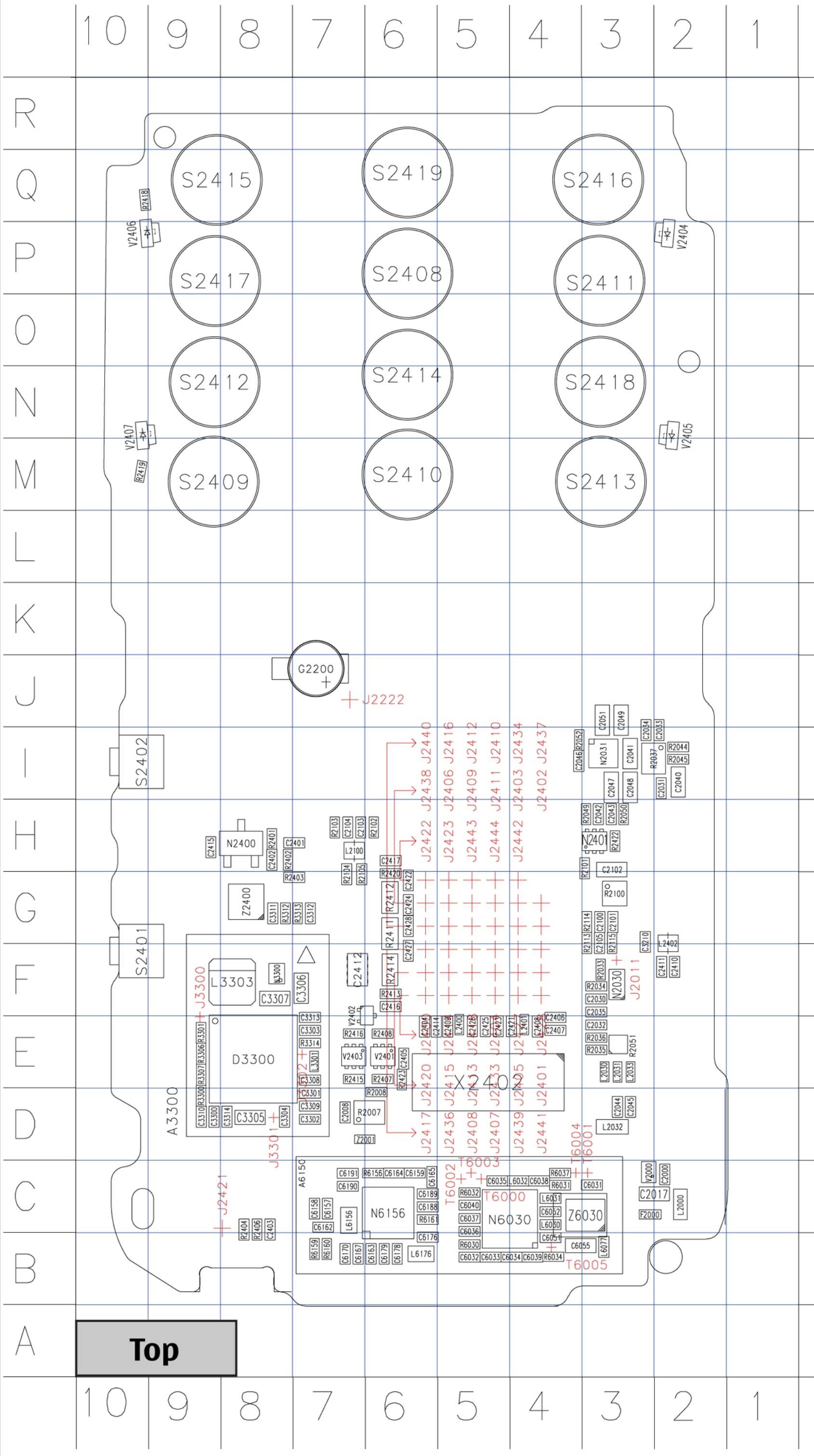

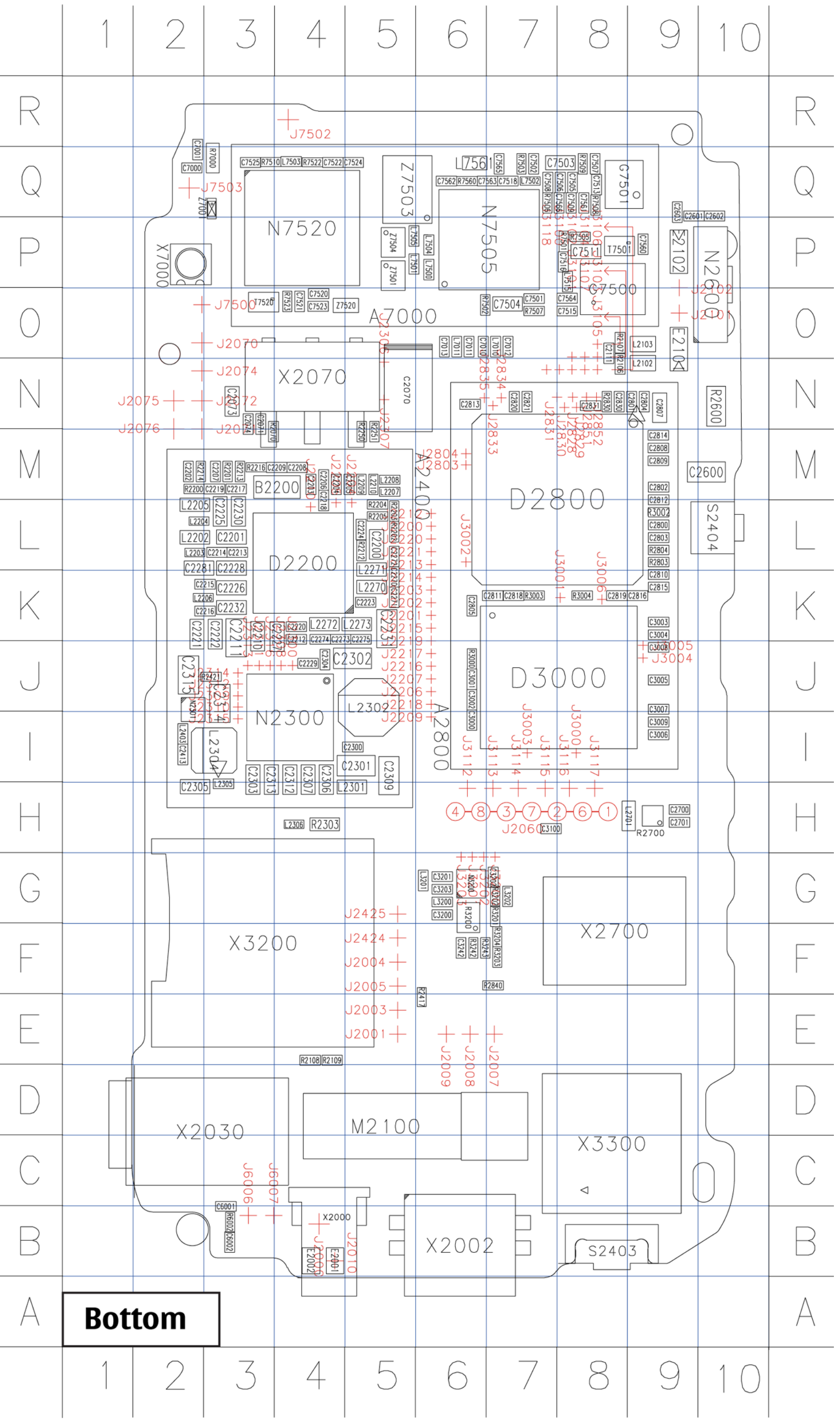

Component finder (RM-174/181, Nokia 5200)

B		C2302	J5	C3201	G6	C7563	Q7	N2031	I3	R2830	N8
B2200	M4	C2303	I3	C3202	G7	C7564	O8	N2300	I4	R2840	F7
C		C2304	J4	C3203	G6	C7565	Q7	N2301	J2	R3000	J6
C2000	C2	C2305	H2	C3210	G3	C7566	Q8	N2400	H8	R3002	L9
C2008	D7	C2306	I4	C3242	F6	D		N2401	H3	R3003	K7
C2017	C3	C2307	I4	C3300	C9	D2200	L4	N2600	P10	R3004	K8
C2030	F3	C2309	I5	C3301	C8	D2800	M8	N3200	G6	R3200	G6
C2031	I2	C2312	I4	C3302	C8	D3000	J8	N6030	C5	R3201	G7
C2032	E3	C2313	I3	C3309	C8	E		N6156	C6	R3202	G7
C2033	I2	C2314	J3	C3310	C9	E2001	B4	N7505	P7	R3203	F7
C2034	I3	C2315	J2	C3321	C8	E2002	B4	N7520	P4	R3204	F7
C2035	F3	C2401	H7	C3322	G8	E2101	O9	R		R3242	F6
C2040	I2	C2402	H8	C3323	G7	E2102	P9	R2007	D6	R3243	F6
C2041	I3	C2403	C8	C3324	C8	F		R2008	D6	R3312	G8
C2042	H3	C2404	E6	C3325	D9	F2000	C3	R2033	F3	R3313	G7
C2043	H3	C2405	E6	C3326	C9	G		R2034	F3	R3314	D8
C2044	D3	C2406	E4	C6001	B3	G2200	J7	R2035	E3	R6002	B3
C2045	D3	C2407	E4	C6002	B3	G7500	O8	R2036	E3	R6030	B5
C2046	I4	C2408	E4	C6031	C3	G7501	Q8	R2037	I3	R6031	C4
C2047	I3	C2409	E5	C6032	B5	L		R2044	I2	R6032	C5
C2048	I3	C2410	F2	C6033	B5	L2000	C2	R2045	I2	R6034	B4
C2049	J3	C2411	F2	C6034	B4	L2030	E3	R2049	H3	R6037	C4
C2051	J3	C2412	F7	C6035	C5	L2031	E3	R2050	H3	R6156	C6
C2070	N5	C2413	I2	C6036	C5	L2032	D3	R2051	E3	R6159	B7
C2071	N3	C2414	E6	C6037	C5	L2033	E3	R2052	I4	R6160	B7
C2073	N3	C2415	H9	C6038	C4	L2100	H7	R2070	M3	R6161	C6
C2074	N3	C2416	F6	C6039	B4	L2102	N9	R2100	G3	R7000	Q3
C2100	G3	C2417	H6	C6040	C5	L2103	O9	R2101	H3	R7501	P8
C2101	G3	C2421	E4	C6051	B4	L2202	L2	R2102	H6	R7502	O6
C2102	H3	C2422	G6	C6052	C4	L2203	L2	R2103	H7	R7503	Q7
C2103	H7	C2423	E5	C6055	B4	L2204	L2	R2104	G7	R7505	P8
C2104	H7	C2424	G6	C6157	C7	L2205	L2	R2105	G7	R7506	Q7
C2105	G3	C2425	E5	C6158	C7	L2206	K2	R2106	N8	R7507	O7
C2111	O8	C2426	E5	C6159	C6	L2207	M5	R2107	O8	R7508	Q8
C2200	L5	C2427	F6	C6162	C7	L2208	M5	R2108	E4	R7509	Q8
C2201	L3	C2428	G6	C6163	B6	L2209	M5	R2109	E4	R7510	Q3
C2202	M2	C2600	M10	C6164	C6	L2210	M5	R2113	G3	R7522	Q4
C2203	M4	C2601	Q9	C6165	C6	L2270	K5	R2114	G3	R7523	O4
C2204	M4	C2602	Q10	C6167	B7	L2271	L5	R2115	G3	R7560	Q6
C2205	M5	C2603	Q9	C6170	B7	L2272	K4	R2200	M2	S	
C2206	M4	C2700	H9	C6176	B6	L2273	K5	R2201	M3	S2401	F10
C2207	M3	C2701	H9	C6178	B6	L2301	H5	R2202	L5	S2402	I10
C2208	M4	C2800	L9	C6179	B6	L2302	J5	R2203	L5	S2403	B8
C2209	M4	C2801	N9	C6188	C6	L2304	I3	R2204	L5	S2404	L10
C2210	K3	C2802	M9	C6189	C6	L2305	H3	R2205	L5	T	
C2211	K3	C2803	L9	C6190	C7	L2306	H4	R2212	L5	T7501	P8
C2212	K4	C2804	N9	C6191	C7	L2400	E5	R2213	M3	T7520	O3
C2213	L3	C2805	K6	C7000	Q2	L2401	E4	R2214	M2	V	
C2214	L3	C2807	N9	C7001	Q2	L2402	G2	R2216	M3	V2000	C3
C2215	K3	C2808	M9	C7010	O6	L2403	I2	R2250	M5	V2401	E6
C2216	K3	C2809	M9	C7011	O6	L2701	H9	R2251	M5	V2402	F6
C2217	M3	C2810	K9	C7012	O7	L3200	G6	R2303	H4	V2403	E7
C2218	L4	C2811	K7	C7013	O6	L3201	G6	R2401	H8	V2404	P2
C2219	M3	C2812	L9	C7501	O7	L3202	G7	R2402	H8	V2405	N2
C2220	K4	C2813	N6	C7502	Q7	L3301	D8	R2403	G7	V2406	P10
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C2222	K3	C2815	K9	C7504	O7	L6030	C4	R2406	C8	X	
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C2227	K4	C2821	N7	C7509	Q8	L6176	B6	R2413	F6	X2402	E5
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C2229	J4	C2831	N8	C7513	Q8	L7011	O6	R2415	E7	X3200	F3
C2230	L3	C3000	I6	C7515	O8	L7500	P6	R2416	E7	X3300	C8
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C2232	K3	C3002	J6	C7518	Q7	L7502	Q7	R2418	Q10	Z	
C2270	K5	C3003	K9	C7520	O4	L7503	Q4	R2419	M10	Z2001	D7
C2271	K5	C3004	K9	C7521	O4	L7504	P6	R2420	G6	Z2400	G8
C2272	L5	C3005	J9	C7522	Q4	L7505	P5	R2421	J3	Z6030	C3
C2273	K4	C3006	I9	C7523	O4	L7515	P8	R2422	H3	Z7001	Q3
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C2275	K5	C3008	J9	C7525	Q3	M		R2600	N10	Z7503	Q5
C2281	L2	C3009	I9	C7560	P9	M2100	D5	R2700	H9	Z7504	P5
C2300	I5	C3100	H7	C7561	Q8	N		R2803	L9	Z7520	O5
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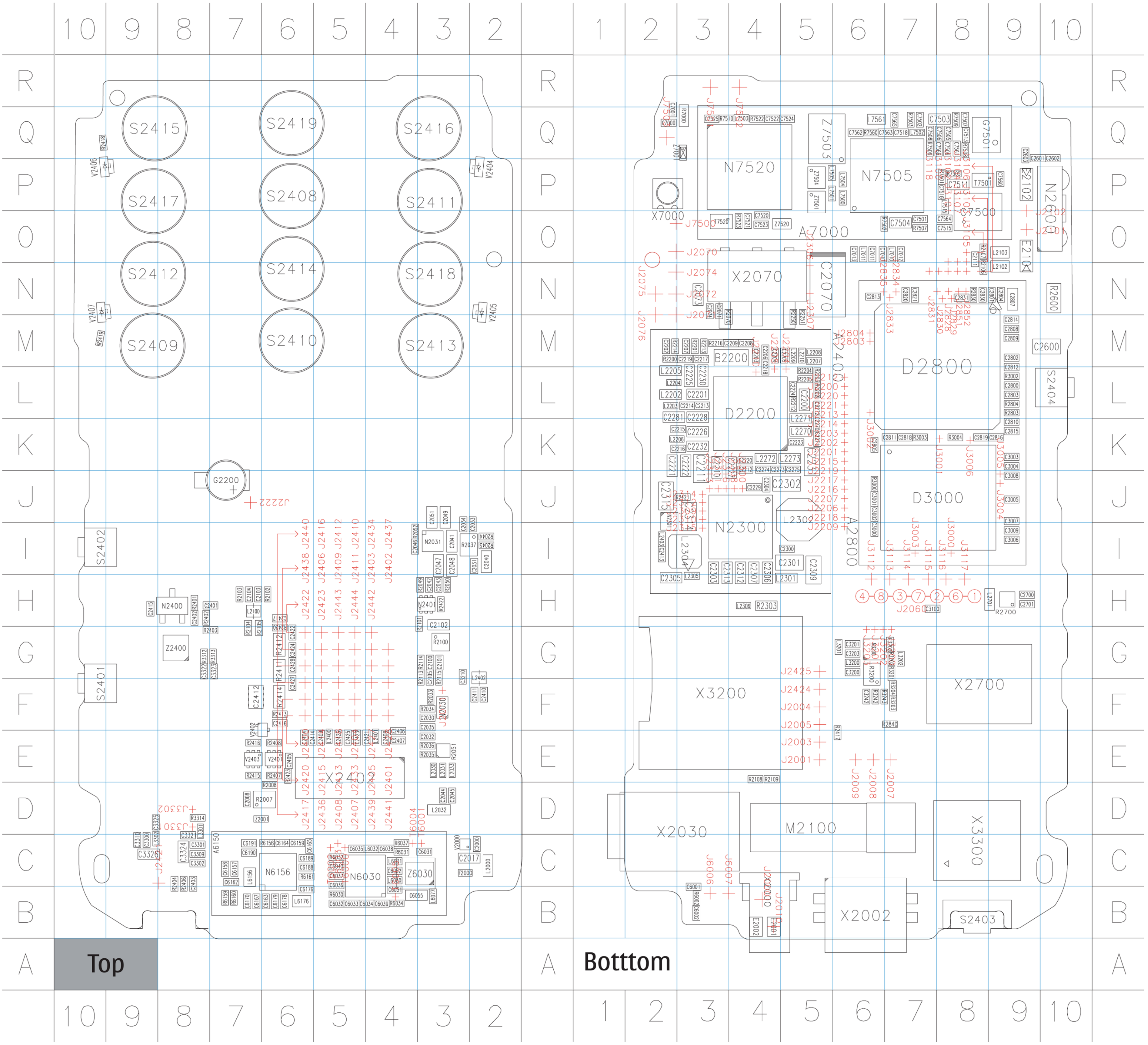
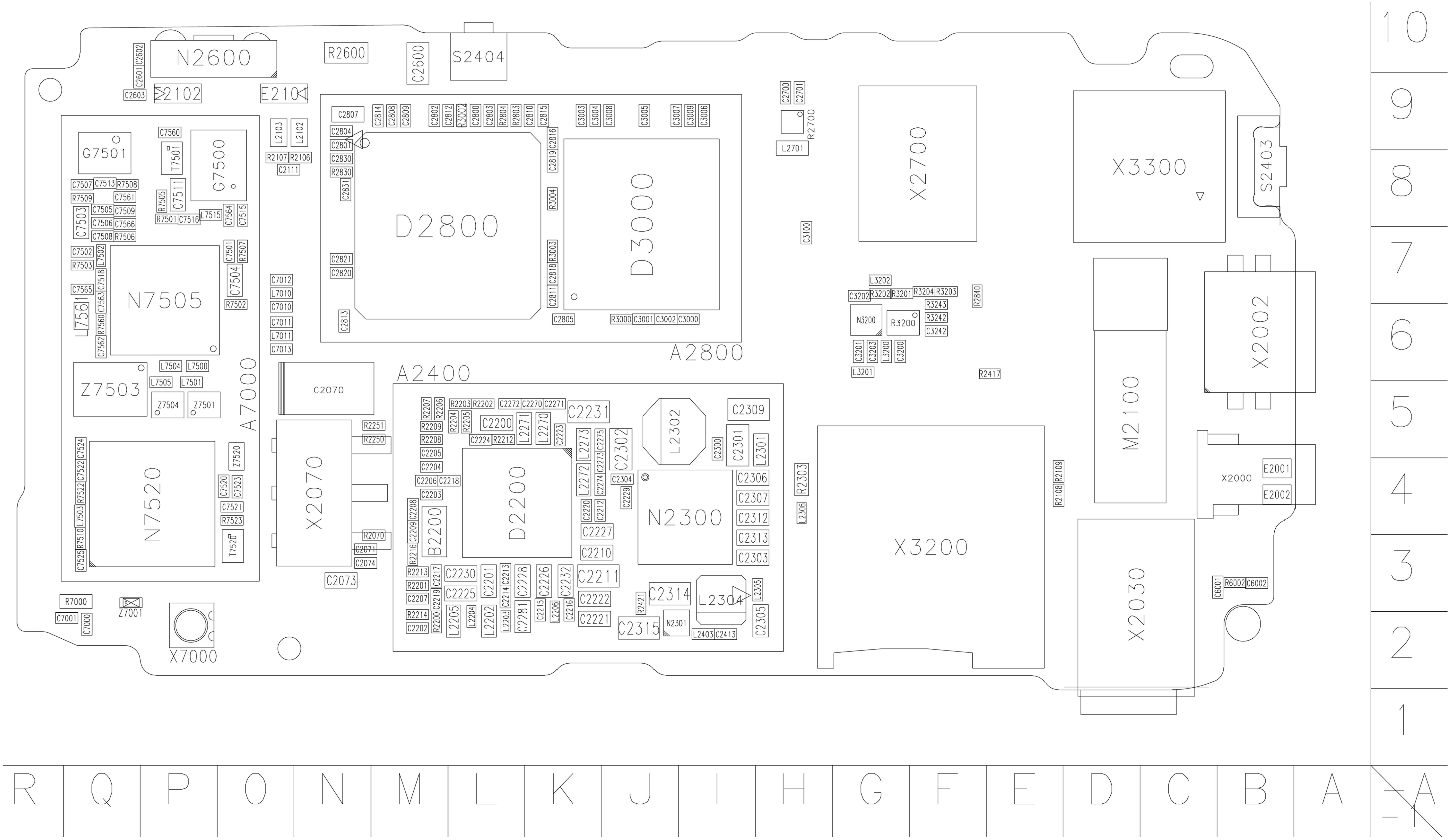


Large scale main board layout, bottom side (1tfa_40a, RM-146/147)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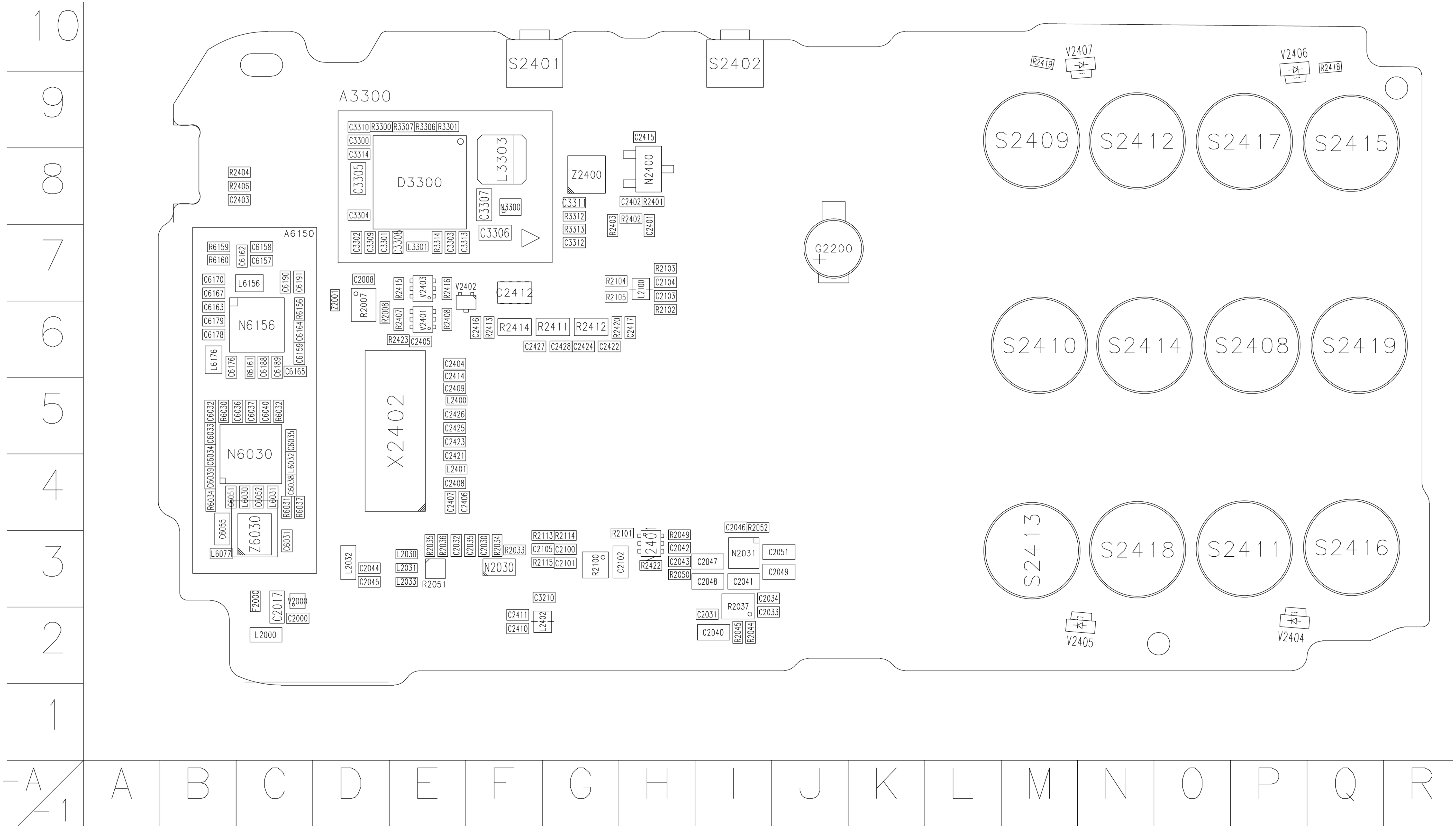
COMPANY CONFIDENTIAL

Large scale main board layout, top side (1tfa_40a, RM-146/147)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V2404

Glossary

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A/D-converter	Analog-to-digital converter
ACI	Accessory Control Interface
ADC	Analog-to-digital converter
ADSP	Application DPS (expected to run high level tasks)
AGC	Automatic gain control (maintains volume)
ALS	Ambient light sensor
AMSL	After Market Service Leader
ARM	Advanced RISC Machines
ARPU	Average revenue per user (per month or per year)
ASIC	Application Specific Integrated Circuit
ASIP	Application Specific Interface Protector
B2B	Board to board, connector between PWB and UI board
BB	Baseband
BC02	Bluetooth module made by CSR
BIQUAD	Bi-quadratic ,type of filter function)
BSI	Battery Size Indicator
BT	Bluetooth
CBus	MCU controlled serial bus connected to UPP_WD2,UEME and Zocus
CCP	Compact Camera Port
CDSP	Cellular DSP (expected to run at low levels)
CLDC	Connected limited device configuration
CMOS	Complimentary metal-oxide semiconductor circuit (low power consumption)
COF	Chip on Foil
COG	Chip on Glass
CPU	Central Processing Unit
CSR	cambridge silicon radio
CSTN	Color Super Twisted Nematic
CTSI	Clock Timing Sleep and interrupt block of Tiku
CW	Continuous wave
D/A-converter	Digital-to-analouge converter
DAC	Digital-to-analouge converter
DBI	Digital Battery Interface
DBus	DSP controlled serial bus connected between UPP_WD2 and Helgo
DCT-4	Digital Core Technology
DMA	Direct memory access
DP	Data Package

DPLL	Digital Phase Locked Loop
DSP	Digital Signal Processor
DtoS	Differential to Single ended
EDGE	Enhanced data rates for global/GSM evaluation
EGSM	Extended GSM
EM	Energy management
EMC	Electromagnetic compability
EMI	Electromagnetic interference
ESD	Electrostatic discharge
FCI	Functional cover interface
FPS	Flash Programming Tool
FR	Full rate
FSTN	Film compensated super twisted nematic
GND	Ground, conductive mass
GPIB	General-purpose interface bus
GPRS	General Packet Radio Service
GSM	Group Special Mobile/Global System for Mobile communication
HF	Hands free
HFCM	Handsfree Common
HS	Handset
HSCSD	High speed circuit switched data (data transmission connection faster than GSM)
HW	Hardware
I/O	Input/Output
IBAT	Battery current
IC	Integrated circuit
ICHAR	Charger current
IF	Interface
IHF	Integrated hands free
IMEI	International Mobile Equipment Identity
IR	Infrared
IrDA	Infrared Data Associasion
ISA	Intelligent software architecture
JPEG/JPG	Joint Photographic Experts Group
LCD	Liquid Crystal Display
LDO	Low Drop Out
LED	Light-emitting diode

LPRF	Low Power Radio Frequency
MCU	Micro Controller Unit (microprocessor)
MCU	Multiport control unit
MIC, mic	Microphone
MIDP	Mobile Information Device Profile
MIN	Mobile identification number
MIPS	Million instructions per second
MMC	Multimedia card
MMS	Multimedia messaging service
NTC	Negative temperature coefficient, temperature sensitive resistor used as a temperature sensor
OMA	Object management architechture
OMAP	Operations, maintenance, and administartion part
Opamp	Operational Amplifier
PA	Power amplifier
PDA	Pocket Data Application
PDA	Personal digital assistant
PDRAM	Program/Data RAM (on chip in Tiku)
Phoenix	Software tool of DCT4.x
PIM	Personal Information Management
PLL	Phase locked loop
PM	(Phone) Permanent memory
PUP	General Purpose IO (PIO), USARTS and Pulse Width Modulators
PURX	Power-up reset
PWB	Printed Wiring Board
PWM	Pulse width modulation
RC-filter	Resistance-Capacitance filter
RF	Radio Frequency
RF PopPort TM	Reduced function PopPortTM interface
RFBUS	Serial control Bus For RF
RSK	Right Soft Key
RS-MMC	Reduced size Multi Media Card
RSSI	Receiving signal strength indicator
RST	Reset Switch
RTC	Real Time Clock (provides date and time)
RX	Radio Receiver

SARAM	Single Access RAM
SAW filter	Surface Acoustic Wave filter
SDRAM	Synchronous Dynamic Random Access Memory
SID	Security ID
SIM	Subscriber Identity Module
SMPS	Switched Mode Power Supply
SNR	Signal-to-noice ratio
SPR	Standard Product requirements
SRAM	Static random access memory
STI	Serial Trace Interface
SW	Software
SWIM	Subscriber/Wallet Identification Module
TCXO	Temperature controlled Oscillator
Tiku	Finnish for Chip, Successor of the UPP, Official Tiku3G
TX	Radio Transmitter
UART	Universal asynchronous receiver/transmitter
UEME	Universal Energy Management chip (Enhanced version)
UEMEK	See UEME
UI	User Interface
UPP	Universal Phone Processor
UPP_WD2	Communicator version of DCT4 system ASIC
USB	Universal Serial Bus
VBAT	Battery voltage
VCHAR	Charger voltage
VCO	Voltage controlled oscillator
VCTCXO	Voltage Controlled Temperature Compensated Crystal Oscillator
VCXO	Voltage Controlled Crystal Oscillator
Vp-p	Peak-to-peak voltage
VSIM	SIM voltage
WAP	Wireless application protocol
WD	Watchdog
XHTML	Extensible hypertext markup language
Zocus	Current sensor, (used to monitor the current flow to and from the battery)